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A APÊNDICE

A.1

Dados potenciométricos

A.1.1

Tabelas relativas aos dados das titulações potenciométricas dos ligantes puros estudados. Força iônica constante ($\mu = 0,1 \text{ mol L}^{-1}$ (KNO_3)) e temperatura constante ($T = 25^\circ\text{C}$)

Tabela A.1.1.a - Solução de PA (En, Tn, Put, Spd e Spm) ($1 \cdot 10^{-3} \text{ mol L}^{-1}$) + 1 mL de HCl $0,1 \text{ mol L}^{-1}$

KOH	pH - En	pH - Tn	pH - Put	pH - Spd	pH - Spm
0	3,161	3,101	3,171	3,092	3,107
0,1	3,2	3,142	3,210	3,134	3,147
0,2	3,248	3,193	3,259	3,184	3,196
0,3	3,308	3,251	3,316	3,245	3,254
0,4	3,377	3,32	3,379	3,317	3,322
0,5	3,454	3,404	3,453	3,400	3,398
0,6	3,553	3,508	3,547	3,507	3,498
0,7	3,676	3,637	3,661	3,641	3,619
0,8	3,847	3,821	3,818	3,843	3,788
0,9	4,136	4,142	4,072	4,207	4,073
1,0	4,801	5,514	4,699	5,763	4,918
1,1	5,551	7,444	7,506	7,238	6,531
1,2	5,926	8,088	8,606	7,691	7,214
1,3	6,171	8,36	8,929	7,939	7,526
1,4	6,363	8,565	9,140	8,138	7,731
1,5	6,537	8,738	9,305	8,307	7,894
1,6	6,707	8,895	9,442	8,464	8,032
1,7	6,884	9,044	9,563	8,611	8,158
1,8	7,081	9,194	9,674	8,756	8,274
1,9	7,339	9,342	9,776	8,902	8,382
2,0	7,722	9,491	9,871	9,048	8,486
2,1	8,383	9,639	9,961	9,191	8,584
2,2	8,852	9,782	10,047	9,326	8,681
2,3	9,145	9,912	10,129	9,453	8,776
2,4	9,331	10,031	10,204	9,568	8,883
2,5	9,496	10,134	10,275	9,677	8,976
2,6	9,622	10,227	10,341	9,774	9,079
2,7	9,755	10,309	10,402	9,865	9,177
2,8	9,869	10,382	10,459	9,947	9,274
2,9	9,979	10,443	10,511	10,027	9,378
3,0	10,084	10,502	10,561	10,102	9,481

Tabela A.1.1.b - Solução de PCr (1.10^{-3} mol L $^{-1}$) + 1 mL de HCl 0,1 mol L $^{-1}$

KOH	pH
0	3,644
0,1	3,742
0,2	3,867
0,3	4,013
0,4	4,171
0,5	4,344
0,6	4,539
0,7	4,755
0,8	5,045
0,9	5,566
1,0	6,670
1,1	9,168
1,2	9,839
1,3	10,114
1,4	10,293
1,5	10,426
1,6	10,528
1,7	10,607
1,8	10,677
1,9	10,739
2,0	10,792
2,1	10,840
2,2	10,884
2,3	10,924
2,4	10,961
2,5	10,994
2,6	11,026
2,7	11,054
2,8	11,082
2,9	11,107
3,0	11,131

Tabela A.1.1.c - Solução de ATP (1.10^{-3} mol L $^{-1}$)

KOH	pH
0	3,724
0,1	3,787
0,2	3,909
0,3	4,000
0,4	4,123
0,5	4,257
0,6	4,41
0,7	4,577
0,8	4,806
0,9	5,122
1,0	5,525
1,1	5,865
1,2	6,115
1,3	6,322
1,4	6,498
1,5	6,681
1,6	6,857

1,7	7,073
1,8	7,352
1,9	7,921
2,0	9,379
2,1	9,881
2,2	10,136
2,3	10,312
2,4	10,432
2,5	10,539

A.1.2

Tabelas relativas aos dados das titulações potenciométricas dos sistemas binários e ternários de Cu(II) estudados. Força iônica constante ($\mu = 0,1 \text{ mol L}^{-1} (\text{KNO}_3)$) e temperatura constante ($T = 25^\circ\text{C}$)

Tabela A.1.2.a - Sistemas binários e ternários de Cu(II): Cu:PCr, Cu:En, Cu:PCr:En

KOH	pH – CuPCr 1:1	pH – CuEn 1:1	pH – CuPCrEn 1:1:1
0	5,832	4,270	4,674
0,1	5,921	4,418	4,709
0,2	6,043	4,522	4,755
0,3	6,215	4,607	4,803
0,4	6,373	4,679	4,85
0,5	6,476	4,745	4,898
0,6	6,537	4,806	4,946
0,7	6,589	4,861	4,995
0,8	6,633	4,919	5,045
0,9	6,676	4,979	5,097
1,0	6,722	5,034	5,149
1,1	6,771	5,091	5,204
1,2	6,827	5,148	5,261
1,3	6,894	5,211	5,324
1,4	6,975	5,276	5,389
1,5	7,087	5,350	5,461
1,6	7,246	5,430	5,54
1,7	7,508	5,520	5,629
1,8	8,068	5,636	5,736
1,9	8,937	5,803	5,867
2,0	9,508	6,129	6,048
2,1	9,845	6,560	6,288
2,2	10,064	6,704	6,471
2,3	10,219	6,785	6,662
2,4	10,340	6,877	6,902
2,5	10,432	6,986	7,162
2,6		7,112	7,423
2,7		7,246	7,736
2,8		7,422	8,126
2,9		7,648	8,588
3,0		7,966	9,276
3,1		8,472	9,807
3,2		9,295	10,095
3,3		9,789	10,284
3,4		10,062	10,421

3,5		10,247	10,529
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Tabela A.1.2.b - Sistemas binários e ternários de Cu(II): Cu:PCr, Cu:Tn, Cu:PCr:Tn

KOH	pH – CuPCr 1:1	pH – CuTn 1:1	pH – CuPCrTn 1:1:1
0	5,832	4,691	5,791
0,1	5,921	5,446	5,827
0,2	6,043	5,822	5,885
0,3	6,215	5,984	5,951
0,4	6,373	6,093	6,031
0,5	6,476	6,182	6,102
0,6	6,537	6,255	6,174
0,7	6,589	6,323	6,248
0,8	6,633	6,388	6,318
0,9	6,676	6,448	6,384
1,0	6,722	6,506	6,456
1,1	6,771	6,568	6,528
1,2	6,827	6,629	6,6
1,3	6,894	6,693	6,676
1,4	6,975	6,759	6,751
1,5	7,087	6,826	6,833
1,6	7,246	6,899	6,919
1,7	7,508	6,976	7,009
1,8	8,068	7,058	7,104
1,9	8,937	7,149	7,205
2,0	9,508	7,232	7,307
2,1	9,845	7,334	7,411
2,2	10,064	7,425	7,516
2,3	10,219	7,526	7,626
2,4	10,340	7,632	7,733
2,5	10,432	7,737	7,848
2,6		7,854	7,971
2,7		7,992	8,115
2,8		8,134	8,291
2,9		8,332	8,522
3,0		8,635	8,928
3,1		9,136	9,432
3,2		9,648	9,796
3,3		9,947	10,037
3,4		10,135	10,209
3,5		10,271	10,342

Tabela A.1.2.c - Sistemas binários e ternários de Cu(II): Cu:PCr, Cu:Put, Cu:PCr:Put

KOH	pH – CuPCr 1:1	pH – CuPut 1:1	pH – CuPCrPut 1:1:1
0	5,832	5,192	5,477
0,1	5,921	5,824	5,527
0,2	6,043	6,085	5,581
0,3	6,215	6,172	5,636
0,4	6,373	6,214	5,699
0,5	6,476	6,252	5,765
0,6	6,537	6,299	5,831
0,7	6,589	6,336	5,898

0,8	6,633	6,369	5,958
0,9	6,676	6,420	6,013
1,0	6,722	6,454	6,060
1,1	6,771	6,502	6,107
1,2	6,827	6,558	6,149
1,3	6,894	6,620	6,189
1,4	6,975	6,715	6,228
1,5	7,087	6,857	6,266
1,6	7,246	7,017	6,304
1,7	7,508	7,588	6,342
1,8	8,068	8,382	6,383
1,9	8,937	8,728	6,423
2,0	9,508	8,945	6,467
2,1	9,845	9,117	6,511
2,2	10,064	9,260	6,566
2,3	10,219	9,385	6,622
2,4	10,340	9,498	6,692
2,5	10,432	9,603	6,768
2,6		9,702	6,859
2,7		9,794	6,993
2,8		9,882	7,179
2,9		9,966	7,476
3,0		10,045	7,863
3,1		10,121	8,187
3,2		10,191	8,436
3,3		10,256	8,616
3,4		10,319	8,767
3,5		10,377	8,893

Tabela A.1.2.d - Sistemas binários e ternários de Cu(II): Cu:PCr, Cu:Spd, Cu:PCr:Spd

KOH	pH – CuPCr 1:1	pH – CuSpd 1:1	pH – CuPCrSpd 1:1:1
0	5,832	5,468	5,520
0,1	5,921	6,136	5,615
0,2	6,043	6,262	5,699
0,3	6,215	6,297	5,805
0,4	6,373	6,320	5,943
0,5	6,476	6,345	6,088
0,6	6,537	6,373	6,191
0,7	6,589	6,400	6,290
0,8	6,633	6,426	6,383
0,9	6,676	5,454	6,488
1,0	6,722	6,480	6,583
1,1	6,771	6,513	6,682
1,2	6,827	6,552	6,767
1,3	6,894	6,593	6,848
1,4	6,975	6,644	6,920
1,5	7,087	6,698	6,988
1,6	7,246	6,752	7,057
1,7	7,508	6,823	7,126
1,8	8,068	6,905	7,193
1,9	8,937	7,008	7,270
2,0	9,508	7,124	7,349

2,1	9,845	7,238	7,437
2,2	10,064	7,378	7,537
2,3	10,219	7,521	7,650
2,4	10,340	7,655	7,779
2,5	10,432	7,787	7,902
2,6		7,908	8,041
2,7		8,036	8,189
2,8		8,165	8,356
2,9		8,301	8,533
3,0		8,411	8,713
3,1		8,550	8,894
3,2		8,695	9,057
3,3		8,856	9,197
3,4		9,005	9,328
3,5		9,156	9,453

Tabela A.1.2.e - Sistemas binários e ternários de Cu(II): Cu:PCr, Cu:Spm, Cu:PCr:Spm

KOH	pH – CuPCr 1:1	pH – CuSpm 1:1	pH – CuPCrSpm 1:1:1
0	5,832	5,08	5,543
0,1	5,921	5,849	5,651
0,2	6,043	6,087	5,748
0,3	6,215	6,200	5,873
0,4	6,373	6,265	5,977
0,5	6,476	6,317	6,086
0,6	6,537	6,364	6,180
0,7	6,589	6,403	6,242
0,8	6,633	6,440	6,301
0,9	6,676	6,471	6,357
1,0	6,722	6,500	6,404
1,1	6,771	6,526	6,447
1,2	6,827	6,551	6,484
1,3	6,894	6,575	6,518
1,4	6,975	6,598	6,551
1,5	7,087	6,620	6,581
1,6	7,246	6,642	6,608
1,7	7,508	6,663	6,635
1,8	8,068	6,684	6,661
1,9	8,937	6,705	6,686
2,0	9,508	6,725	6,714
2,1	9,845	6,746	6,737
2,2	10,064	6,768	6,762
2,3	10,219	6,789	6,787
2,4	10,340	6,812	6,814
2,5	10,432	6,835	6,843
2,6		6,859	6,872
2,7		6,884	6,904
2,8		6,911	6,937
2,9		6,939	6,974
3,0		6,969	7,014
3,1		7,002	7,058
3,2		7,038	7,110
3,3		7,080	7,167

3,4		7,130	7,235
3,5		7,188	7,313
3,6		7,264	7,404
3,7		7,373	7,519
3,8		7,518	7,693
3,9		7,812	8,084
4,0		8,874	8,890
4,1		9,546	9,436
4,2		9,885	9,768
4,3		10,124	10,009
4,4		10,294	10,194
4,5		10,427	10,331
4,6		10,532	10,442
4,7		10,623	10,533
4,8		10,697	10,610
4,9		10,761	10,677
5,0		10,819	10,735

A.1.3 - Tabelas relativas aos dados das titulações potenciométricas dos sistemas binários e ternários de Zn(II) estudados. Força iônica constante ($\mu = 0,1 \text{ mol L}^{-1} (\text{KNO}_3)$) e temperatura constante ($T = 25^\circ\text{C}$)

Tabela A.1.3.a - Sistemas binários e ternários de Zn(II): Zn:PCr, Zn:En, Zn:PCr:En

KOH	pH – ZnPCr 1:1	pH – ZnEn 1:1	pH – ZnPCrEn 1:1:1
0	6,275	5,454	6,796
0,1	6,456	6,141	6,695
0,2	6,573	6,462	6,71
0,3	6,736	6,659	6,77
0,4	7,008	6,801	6,836
0,5	7,162	6,916	6,905
0,6	7,252	7,018	6,976
0,7	7,318	7,113	7,049
0,8	7,381	7,204	7,122
0,9	7,443	7,29	7,193
1	7,504	7,374	7,262
1,1	7,566	7,454	7,333
1,2	7,63	7,539	7,405
1,3	7,7	7,623	7,477
1,4	7,78	7,711	7,551
1,5	7,875	7,799	7,626
1,6	7,998	7,882	7,703
1,7	8,206	7,966	7,783
1,8	8,794	8,048	7,864
1,9	9,614	8,128	7,941
2	10,008	8,211	8,018
2,1	10,24	8,311	8,096
2,2	10,402	8,431	8,176
2,3	10,523	8,573	8,258
2,4	10,621	8,734	8,357
2,5	10,702	8,92	8,471
2,6	10,771	9,124	8,603

2,7	10,831	9,316	8,75
2,8	10,884	9,492	8,92
2,9	10,931	9,647	9,108
3	10,973	9,785	9,292
3,1	11,013	9,907	9,468
3,2	11,049	10,016	9,622
3,3	11,082	10,117	9,76
3,4	11,114	10,21	9,884
3,5	11,143	10,295	9,996
3,6	11,17	10,375	10,098
3,7	11,196	10,449	10,19
3,8	11,22	10,518	10,275
3,9	11,243	10,582	10,355
4	11,265	10,643	10,43
4,1	11,285	10,699	10,498
4,2	11,305	10,75	10,563
4,3	11,324	10,798	10,623
4,4	11,343	10,843	10,68
4,5	11,36	10,884	10,732
4,6	11,377	10,924	10,78
4,7	11,393	10,96	10,825
4,8	11,409	10,994	10,867
4,9	11,424	11,025	10,906
5	11,438	11,056	10,944

Tabela A.1.3.b - Sistemas binários e ternários de Zn(II): Zn:PCr, Zn:Tn, Zn:PCr:Tn

KOH	pH – ZnPCr 1:1	pH – ZnTn 1:1	pH – ZnPCrTn 1:1:1
0	6,275	6,647	7,301
0,1	6,456	7,233	7,332
0,2	6,573	7,519	7,444
0,3	6,736	7,602	7,619
0,4	7,008	7,648	7,793
0,5	7,162	7,692	7,886
0,6	7,252	7,734	7,94
0,7	7,318	7,775	7,98
0,8	7,381	7,817	8,019
0,9	7,443	7,859	8,053
1,0	7,504	7,902	8,084
1,1	7,566	7,949	8,115
1,2	7,63	8	8,146
1,3	7,7	8,053	8,177
1,4	7,78	8,107	8,208
1,5	7,875	8,164	8,241
1,6	7,998	8,223	8,278
1,7	8,206	8,281	8,319
1,8	8,794	8,341	8,363
1,9	9,614	8,404	8,418
2,0	10,008	8,469	8,474
2,1	10,24	8,542	8,543
2,2	10,402	8,624	8,621
2,3	10,523	8,713	8,714

2,4	10,621	8,812	8,815
2,5	10,702	8,92	8,927
2,6	10,771	9,037	9,044
2,7	10,831	9,159	9,168
2,8	10,884	9,294	9,298
2,9	10,931	9,43	9,427
3,0	10,973	9,571	9,563
3,1	11,013	9,713	9,697
3,2	11,049	9,843	9,823
3,3	11,082	9,963	9,939
3,4	11,114	10,073	10,048
3,5	11,143	10,169	10,149
3,6	11,17	10,258	10,243
3,7	11,196	10,338	10,33
3,8	11,22	10,411	10,408
3,9	11,243	10,477	10,477
4	11,265	10,54	10,541
4,1	11,285	10,597	10,598
4,2	11,305	10,65	10,65
4,3	11,324	10,7	10,7
4,4	11,343	10,747	10,745
4,5	11,36	10,79	10,789
4,6	11,377	10,832	10,828
4,7	11,393	10,87	10,866
4,8	11,409	10,906	10,902
4,9	11,424	10,939	10,935
5	11,438	10,972	10,967

Tabela A.1.3.c - Sistemas binários e ternários de Zn(II): Zn:PCr, Zn:Put, Zn:PCr:Put

KOH	pH – ZnPCr 1:1	pH – ZnPut 1:1	pH – ZnPCrPut 1:1:1
0	6,275	6,663	6,767
0,1	6,456	7,001	6,75
0,2	6,573	7,162	6,786
0,3	6,736	7,24	6,844
0,4	7,008	7,291	6,921
0,5	7,162	7,341	7,017
0,6	7,252	7,388	7,115
0,7	7,318	7,433	7,213
0,8	7,381	7,478	7,305
0,9	7,443	7,523	7,39
1,0	7,504	7,567	7,475
1,1	7,566	7,615	7,564
1,2	7,63	7,665	7,659
1,3	7,7	7,721	7,775
1,4	7,78	7,785	7,933
1,5	7,875	7,859	8,154
1,6	7,998	7,951	8,439
1,7	8,206	8,079	8,729
1,8	8,794	8,283	8,953
1,9	9,614	8,606	9,133
2,0	10,008	8,919	9,278

2,1	10,24	9,151	9,405
2,2	10,402	9,335	9,517
2,3	10,523	9,489	9,616
2,4	10,621	9,624	9,709
2,5	10,702	9,744	9,796
2,6	10,771	9,853	9,878
2,7	10,831	9,955	9,957
2,8	10,884	10,05	10,031
2,9	10,931	10,139	10,103
3,0	10,973	10,222	10,173
3,1	11,013	10,302	10,24
3,2	11,049	10,376	10,304
3,3	11,082	10,445	10,366
3,4	11,114	10,509	10,425
3,5	11,143	10,57	10,481
3,6	11,17	10,625	10,534
3,7	11,196	10,677	10,585
3,8	11,22	10,727	10,633
3,9	11,243	10,772	10,678
4	11,265	10,815	10,721
4,1	11,285	10,857	10,762
4,2	11,305	10,894	10,801
4,3	11,324	10,93	10,838
4,4	11,343	10,965	10,873
4,5	11,36	10,996	10,907
4,6	11,377	11,027	10,939
4,7	11,393	11,056	10,969
4,8	11,409	11,082	10,998
4,9	11,424	11,109	11,026
5	11,438	11,133	11,052

Tabela A.1.3.d - Sistemas binários e ternários de Zn(II): Zn:PCr, Zn:Spd, Zn:PCr:Spd

KOH	pH – ZnPCr 1:1	pH – ZnSpd 1:1	pH – ZnPCrSpd 1:1:1
0	6,275	5,973	6,818
0,1	6,456	6,85	6,814
0,2	6,573	7,271	6,852
0,3	6,736	7,385	6,906
0,4	7,008	7,443	6,977
0,5	7,162	7,489	7,066
0,6	7,252	7,53	7,179
0,7	7,318	7,569	7,299
0,8	7,381	7,607	7,424
0,9	7,443	7,643	7,539
1,0	7,504	7,679	7,627
1,1	7,566	7,716	7,705
1,2	7,63	7,754	7,782
1,3	7,7	7,793	7,851
1,4	7,78	7,836	7,921
1,5	7,875	7,882	7,994
1,6	7,998	7,933	8,072
1,7	8,206	7,988	8,153

1,8	8,794	8,051	8,243
1,9	9,614	8,12	8,341
2,0	10,008	8,2	8,446
2,1	10,24	8,29	8,561
2,2	10,402	8,393	8,679
2,3	10,523	8,502	8,802
2,4	10,621	8,625	8,926
2,5	10,702	8,759	9,047
2,6	10,771	8,899	9,167
2,7	10,831	9,043	9,281
2,8	10,884	9,19	9,388
2,9	10,931	9,333	9,486
3,0	10,973	9,471	9,578
3,1	11,013	9,599	9,665
3,2	11,049	9,715	9,746
3,3	11,082	9,821	9,822
3,4	11,114	9,919	9,895
3,5	11,143	10,01	9,965
3,6	11,17	10,095	10,03
3,7	11,196	10,173	10,095
3,8	11,22	10,248	10,156
3,9	11,243	10,319	10,215
4	11,265	10,384	10,272
4,1	11,285	10,447	10,328
4,2	11,305	10,506	10,382
4,3	11,324	10,562	10,434
4,4	11,343	10,614	10,485
4,5	11,36	10,664	10,534
4,6	11,377	10,71	10,58
4,7	11,393	10,754	10,626
4,8	11,409	10,796	10,668
4,9	11,424	10,835	10,71
5	11,438	10,872	10,749

Tabela A.1.3.e - Sistemas binários e ternários de Zn(II): Zn:PCr, Zn:Spm, Zn:PCr:Spm

KOH	pH – ZnPCr 1:1	pH – ZnSpm 1:1	pH – ZnPCrSpm 1:1:1
0	6,275	5,854	6,864
0,1	6,456	6,809	6,922
0,2	6,573	7,236	7,014
0,3	6,736	7,434	7,153
0,4	7,008	7,549	7,316
0,5	7,162	7,644	7,475
0,6	7,252	7,705	7,612
0,7	7,318	7,76	7,723
0,8	7,381	7,81	7,823
0,9	7,443	7,856	7,89
1,0	7,504	7,903	7,943
1,1	7,566	7,949	7,985
1,2	7,63	7,994	8,019
1,3	7,7	8,035	8,051
1,4	7,78	8,074	8,081

1,5	7,875	8,108	8,111
1,6	7,998	8,139	8,141
1,7	8,206	8,167	8,169
1,8	8,794	8,195	8,2
1,9	9,614	8,222	8,23
2,0	10,008	8,249	8,26
2,1	10,24	8,278	8,29
2,2	10,402	8,307	8,321
2,3	10,523	8,337	8,354
2,4	10,621	8,369	8,388
2,5	10,702	8,403	8,426
2,6	10,771	8,439	8,466
2,7	10,831	8,479	8,51
2,8	10,884	8,521	8,557
2,9	10,931	8,568	8,609
3,0	10,973	8,619	8,666
3,1	11,013	8,676	8,73
3,2	11,049	8,739	8,798
3,3	11,082	8,808	8,873
3,4	11,114	8,884	8,958
3,5	11,143	8,968	9,049
3,6	11,17	9,059	9,148
3,7	11,196	9,158	9,252
3,8	11,22	9,257	9,358
3,9	11,243	9,364	9,464
4,0	11,265	9,473	9,574
4,1	11,285	9,579	9,68
4,2	11,305	9,683	9,781
4,3	11,324	9,78	9,876
4,4	11,343	9,875	9,965
4,5	11,36	9,964	10,047
4,6	11,377	10,046	10,122
4,7	11,393	10,122	10,193
4,8	11,409	10,194	10,259
4,9	11,424	10,262	10,321
5,0	11,438	10,327	10,381

Tabela A.1.3.f - Sistemas binários e ternários de Zn(II): Zn:ATP, Zn:En, Zn:ATP:En

KOH	pH – ZnATP 1:1	pH – ZnEn 1:1	pH – ZnATPEn 1:1:1
0	3,652	5,454	3,611
0,1	3,706	6,141	3,669
0,2	3,774	6,462	3,747
0,3	3,845	6,659	3,831
0,4	3,919	6,801	3,923
0,5	3,997	6,916	4,012
0,6	4,077	7,018	4,107
0,7	4,162	7,113	4,206
0,8	4,249	7,204	4,309
0,9	4,338	7,29	4,416
1,0	4,434	7,374	4,526
1,1	4,538	7,454	4,651

1,2	4,647	7,539	4,785
1,3	4,767	7,623	4,932
1,4	4,899	7,711	5,098
1,5	5,051	7,799	5,295
1,6	5,225	7,882	5,525
1,7	5,433	7,966	5,79
1,8	5,696	8,048	6,072
1,9	6,06	8,128	6,332
2,0	6,642	8,211	6,54
2,1	7,353	8,311	6,7
2,2	7,877	8,431	6,841
2,3	8,209	8,573	6,954
2,4	8,442	8,734	7,057
2,5	8,609	8,92	7,154
2,6	8,734	9,124	7,241
2,7	8,826	9,316	7,33
2,8	8,908	9,492	7,417
2,9	8,985	9,647	7,502
3,0	9,056	9,785	7,597
3,1	9,124	9,907	7,696
3,2	9,192	10,016	7,798
3,3	9,263	10,117	7,911
3,4	9,333	10,21	8,042
3,5	9,414	10,295	8,187
3,6	9,497	10,375	8,348
3,7	9,598	10,449	8,545
3,8	9,703	10,518	8,739
3,9	9,829	10,582	8,923
4,0	9,969	10,643	9,102
4,1	10,111	10,699	9,265
4,2	10,231	10,75	9,402
4,3	10,341	10,798	9,519
4,4	10,435	10,843	9,626
4,5	10,517	10,884	9,719
4,6	10,587	10,924	9,803
4,7	10,649	10,96	9,879
4,8	10,705	10,994	9,951
4,9	10,756	11,025	10,016
5,0	10,802	11,056	10,081

Tabela A.1.3.g - Sistemas binários e ternários de Zn(II): Zn:ATP, Zn:Tn, Zn:ATP:Tn

KOH	pH – ZnATP 1:1	pH – ZnTn 1:1	pH – ZnATPTn 1:1:1
0	3,652	6,647	3,669
0,1	3,706	7,233	3,72
0,2	3,774	7,519	3,799
0,3	3,845	7,602	3,883
0,4	3,919	7,648	3,97
0,5	3,997	7,692	4,063
0,6	4,077	7,734	4,159
0,7	4,162	7,775	4,257
0,8	4,249	7,817	4,362
0,9	4,338	7,859	4,468

1,0	4,434	7,902	4,58
1,1	4,538	7,949	4,704
1,2	4,647	8	4,846
1,3	4,767	8,053	4,997
1,4	4,899	8,107	5,173
1,5	5,051	8,164	5,384
1,6	5,225	8,223	5,645
1,7	5,433	8,281	5,98
1,8	5,696	8,341	6,435
1,9	6,06	8,404	6,965
2,0	6,642	8,469	7,422
2,1	7,353	8,542	7,703
2,2	7,877	8,624	7,89
2,3	8,209	8,713	8,036
2,4	8,442	8,812	8,154
2,5	8,609	8,92	8,272
2,6	8,734	9,037	8,367
2,7	8,826	9,159	8,457
2,8	8,908	9,294	8,54
2,9	8,985	9,43	8,618
3,0	9,056	9,571	8,686
3,1	9,124	9,713	8,758
3,2	9,192	9,843	8,822
3,3	9,263	9,963	8,886
3,4	9,333	10,073	8,954
3,5	9,414	10,169	9,017
3,6	9,497	10,258	9,08
3,7	9,598	10,338	9,146
3,8	9,703	10,411	9,212
3,9	9,829	10,477	9,278
4	9,969	10,54	9,346
4,1	10,111	10,597	9,418
4,2	10,231	10,65	9,489
4,3	10,341	10,7	9,559
4,4	10,435	10,747	9,633
4,5	10,517	10,79	9,707
4,6	10,587	10,832	9,78
4,7	10,649	10,87	9,851
4,8	10,705	10,906	9,922
4,9	10,756	10,939	9,99
5	10,802	10,972	10,058

Tabela A.1.3.h - Sistemas binários e ternários de Zn(II): Zn:ATP, Zn:Put, Zn:ATP:Put

KOH	pH – ZnATP 1:1	pH – ZnPut 1:1	pH – ZnATPPut 1:1:1
0	3,652	6,663	3,659
0,1	3,706	7,001	3,712
0,2	3,774	7,162	3,79
0,3	3,845	7,24	3,876
0,4	3,919	7,291	3,964
0,5	3,997	7,341	4,056
0,6	4,077	7,388	4,155

0,7	4,162	7,433	4,251
0,8	4,249	7,478	4,357
0,9	4,338	7,523	4,464
1,0	4,434	7,567	4,579
1,1	4,538	7,615	4,704
1,2	4,647	7,665	4,841
1,3	4,767	7,721	4,997
1,4	4,899	7,785	5,176
1,5	5,051	7,859	5,39
1,6	5,225	7,951	5,656
1,7	5,433	8,079	6,001
1,8	5,696	8,283	6,488
1,9	6,06	8,606	7,084
2,0	6,642	8,919	7,503
2,1	7,353	9,151	7,813
2,2	7,877	9,335	8,061
2,3	8,209	9,489	8,249
2,4	8,442	9,624	8,412
2,5	8,609	9,744	8,57
2,6	8,734	9,853	8,701
2,7	8,826	9,955	8,81
2,8	8,908	10,05	8,903
2,9	8,985	10,139	8,982
3,0	9,056	10,222	9,05
3,1	9,124	10,302	9,116
3,2	9,192	10,376	9,176
3,3	9,263	10,445	9,233
3,4	9,333	10,509	9,29
3,5	9,414	10,57	9,345
3,6	9,497	10,625	9,401
3,7	9,598	10,677	9,458
3,8	9,703	10,727	9,517
3,9	9,829	10,772	9,575
4,0	9,969	10,815	9,637
4,1	10,111	10,857	9,701
4,2	10,231	10,894	9,767
4,3	10,341	10,93	9,833
4,4	10,435	10,965	9,9
4,5	10,517	10,996	9,969
4,6	10,587	11,027	10,037
4,7	10,649	11,056	10,103
4,8	10,705	11,082	10,17
4,9	10,756	11,109	10,233
5,0	10,802	11,133	10,295

Tabela A.1.3.i - Sistemas binários e ternários de Zn(II): Zn:ATP, Zn:Spd, Zn:ATP:Spd

KOH	pH – ZnATP 1:1	pH – ZnSpd 1:1	pH - ZnATPSpd 1:1:1
0	3,652	5,854	3,626
0,1	3,706	6,809	3,685
0,2	3,774	7,236	3,769
0,3	3,845	7,434	3,853

0,4	3,919	7,549	3,94
0,5	3,997	7,644	4,029
0,6	4,077	7,705	4,121
0,7	4,162	7,76	4,216
0,8	4,249	7,81	4,313
0,9	4,338	7,856	4,413
1,0	4,434	7,903	4,519
1,1	4,538	7,949	4,633
1,2	4,647	7,994	4,756
1,3	4,767	8,035	4,889
1,4	4,899	8,074	5,037
1,5	5,051	8,108	5,207
1,6	5,225	8,139	5,403
1,7	5,433	8,167	5,644
1,8	5,696	8,195	5,95
1,9	6,06	8,222	6,374
2,0	6,642	8,249	6,842
2,1	7,353	8,278	7,159
2,2	7,877	8,307	7,389
2,3	8,209	8,337	7,566
2,4	8,442	8,369	7,715
2,5	8,609	8,403	7,838
2,6	8,734	8,439	7,948
2,7	8,826	8,479	8,046
2,8	8,908	8,521	8,135
2,9	8,985	8,568	8,217
3,0	9,056	8,619	8,293
3,1	9,124	8,676	8,365
3,2	9,192	8,739	8,431
3,3	9,263	8,808	8,494
3,4	9,333	8,884	8,553
3,5	9,414	8,968	8,609
3,6	9,497	9,059	8,663
3,7	9,598	9,158	8,714
3,8	9,703	9,257	8,764
3,9	9,829	9,364	8,811
4	9,969	9,473	8,859
4,1	10,111	9,579	8,905
4,2	10,231	9,683	8,951
4,3	10,341	9,78	8,998
4,4	10,435	9,875	9,045
4,5	10,517	9,964	9,092
4,6	10,587	10,046	9,14
4,7	10,649	10,122	9,188
4,8	10,705	10,194	9,237
4,9	10,756	10,262	9,286
5	10,802	10,327	9,336

Tabela A.1.3.j - Sistemas binários e ternários de Zn(II): Zn:ATP, Zn:Spm, Zn:ATP:Spm

KOH	pH – ZnATP 1:1	pH – ZnSpm 1:1	pH – ZnATPSpm 1:1:1
0	3,652	5,854	3,626

0,1	3,706	6,809	3,685
0,2	3,774	7,236	3,769
0,3	3,845	7,434	3,853
0,4	3,919	7,549	3,94
0,5	3,997	7,644	4,029
0,6	4,077	7,705	4,121
0,7	4,162	7,76	4,216
0,8	4,249	7,81	4,313
0,9	4,338	7,856	4,413
1,0	4,434	7,903	4,519
1,1	4,538	7,949	4,633
1,2	4,647	7,994	4,756
1,3	4,767	8,035	4,889
1,4	4,899	8,074	5,037
1,5	5,051	8,108	5,207
1,6	5,225	8,139	5,403
1,7	5,433	8,167	5,644
1,8	5,696	8,195	5,95
1,9	6,06	8,222	6,374
2,0	6,642	8,249	6,842
2,1	7,353	8,278	7,159
2,2	7,877	8,307	7,389
2,3	8,209	8,337	7,566
2,4	8,442	8,369	7,715
2,5	8,609	8,403	7,838
2,6	8,734	8,439	7,948
2,7	8,826	8,479	8,046
2,8	8,908	8,521	8,135
2,9	8,985	8,568	8,217
3,0	9,056	8,619	8,293
3,1	9,124	8,676	8,365
3,2	9,192	8,739	8,431
3,3	9,263	8,808	8,494
3,4	9,333	8,884	8,553
3,5	9,414	8,968	8,609
3,6	9,497	9,059	8,663
3,7	9,598	9,158	8,714
3,8	9,703	9,257	8,764
3,9	9,829	9,364	8,811
4,0	9,969	9,473	8,859
4,1	10,111	9,579	8,905
4,2	10,231	9,683	8,951
4,3	10,341	9,78	8,998
4,4	10,435	9,875	9,045
4,5	10,517	9,964	9,092
4,6	10,587	10,046	9,14
4,7	10,649	10,122	9,188
4,8	10,705	10,194	9,237
4,9	10,756	10,262	9,286
5,0	10,802	10,327	9,336
5,1			9,388
5,2			9,439
5,3			9,493

5,4			9,547
5,5			9,603
5,6			9,658
5,7			9,715
5,8			9,772
5,9			9,83
6,0			9,887
6,1			9,944
6,2			10,001
6,3			10,057
6,4			10,112
6,5			10,165
6,6			10,218
6,7			10,269
6,8			10,319
6,9			10,368
7,0			10,416

A.2

Espectros Ultravioleta- Visível

A.2.1

Espectros do Ultravioleta e visível para os sistemas binários Cu:PA (PA=Put e Spm) e sistemas ternários Cu:PCr:PA (PA=en, tn, Put, Spd e Spm)

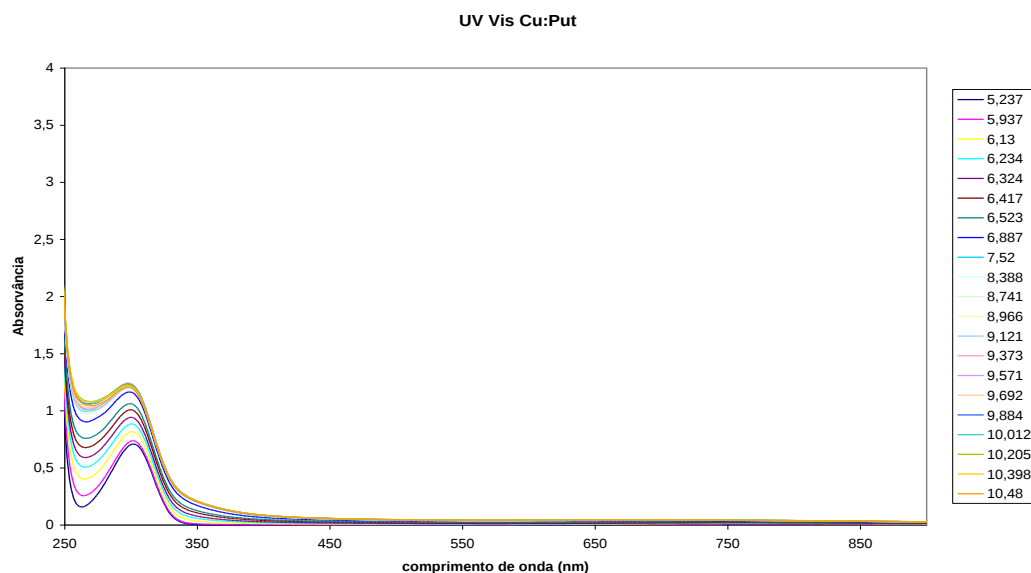


Figura A.2.1.a - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:Put, na proporção Cu:Put 1:1.

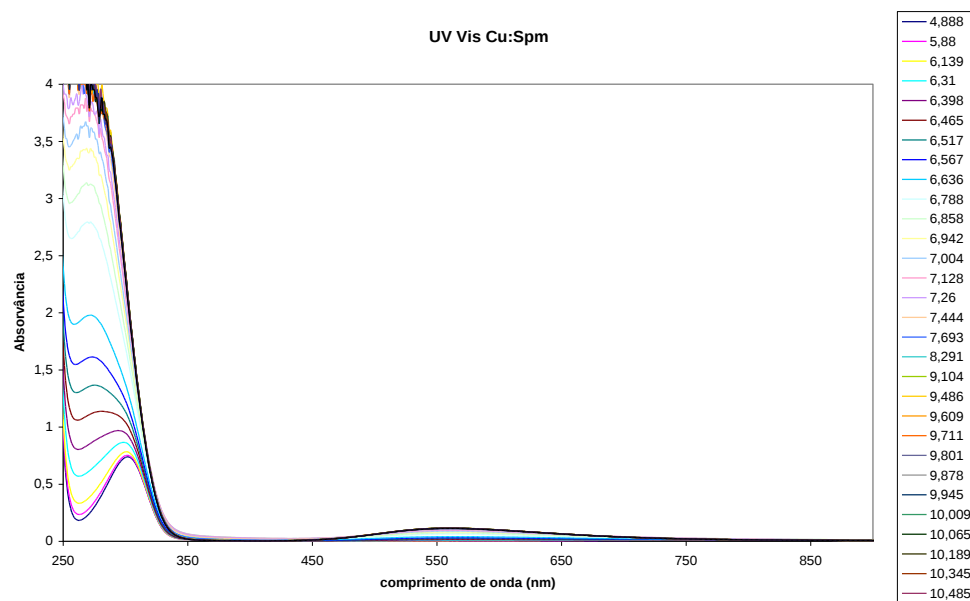


Figura A.2.1.b - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:Spm, na proporção Cu:Spm 1:1.

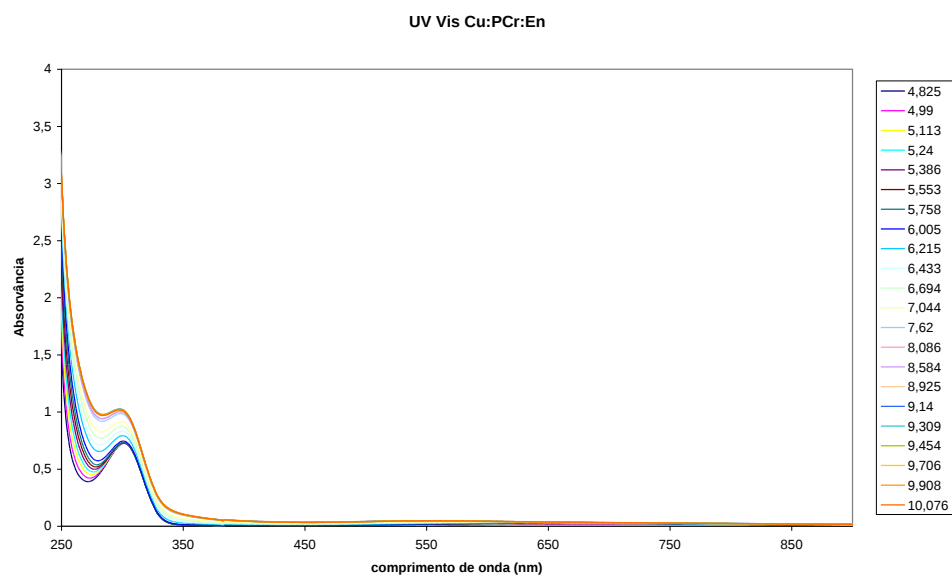


Figura A.2.1.c - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:PCr:en, na proporção Cu:PCr:en 1:1:1.

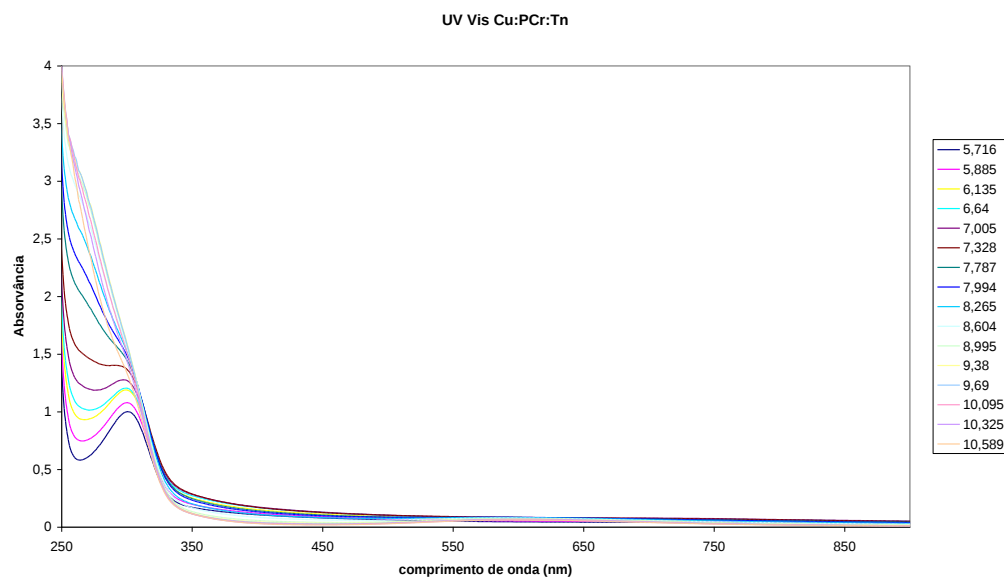


Figura A.2.1.d - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:PCr:tn, na proporção Cu:PCr:tn 1:1:1.

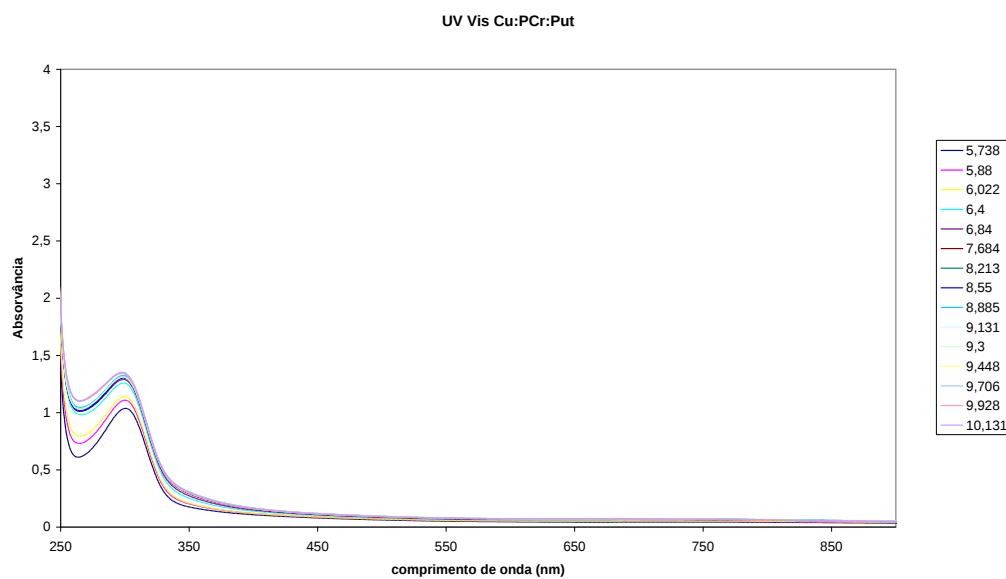


Figura A.2.1.e - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:PCr:Put, na proporção Cu:PCr:Put 1:1:1.

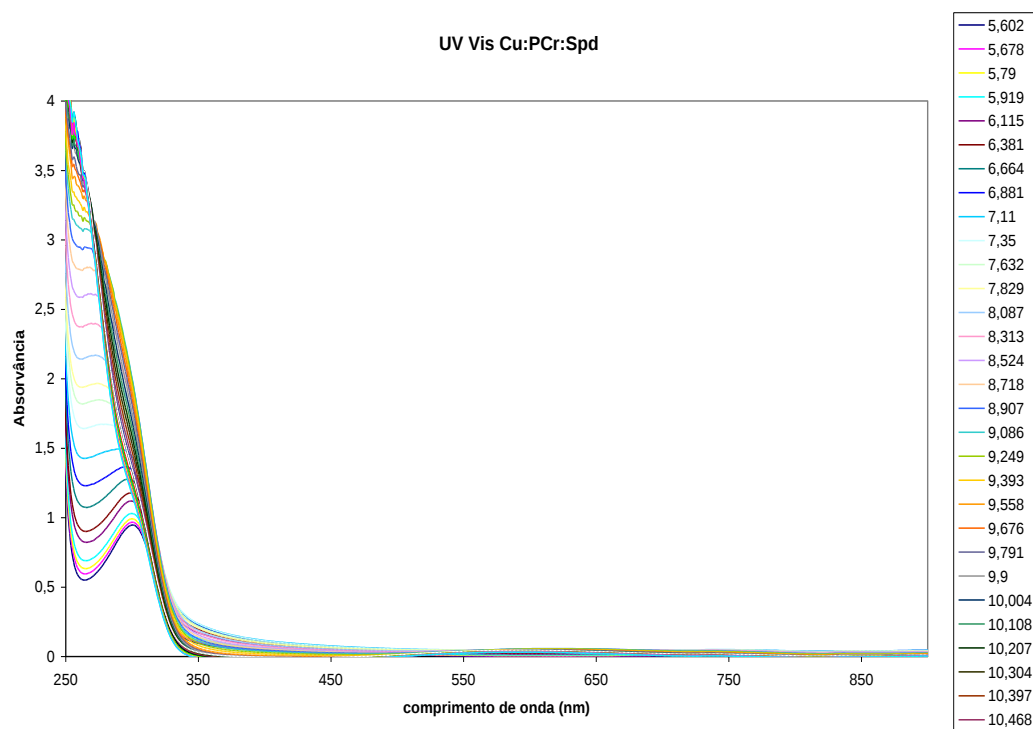


Figura A.2.1.f - Espectro de ultravioleta em diferentes valores de pH do sistema Cu:PCr:Spd, na proporção Cu:PCr:Spd 1:1:1.

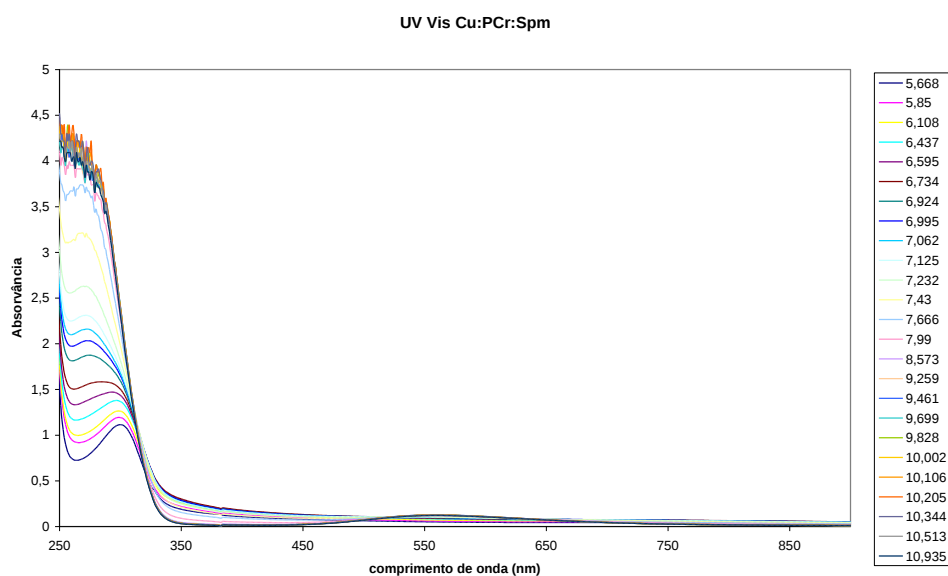


Figura A.2.1.g- Espectro de ultravioleta em diferentes valores de pH do sistema Cu:PCr:Spm, na proporção Cu:PCr:Spm 1:1:1.

A.3 Raman

A.3.1 Espectros do Raman para os ligantes puros

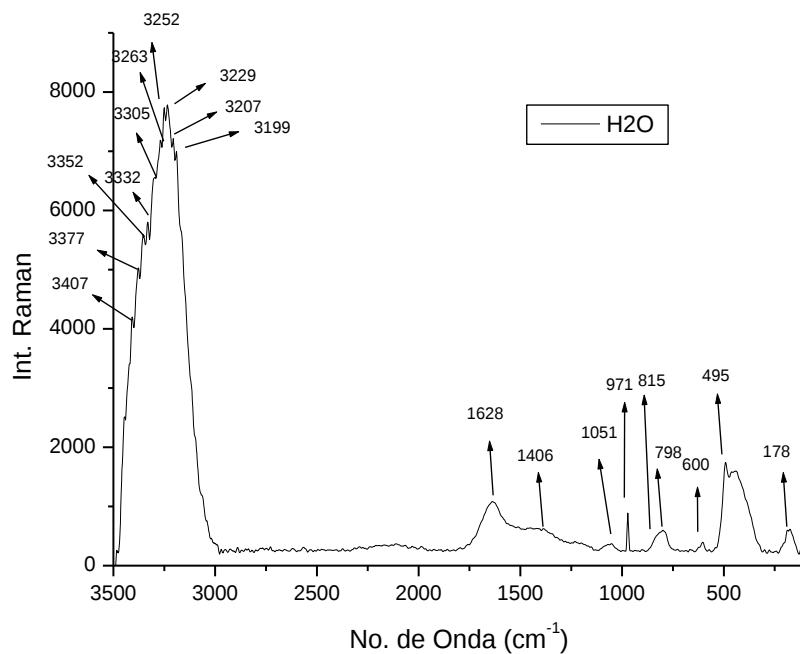


Figura A.3.1.a – Espectro Raman para H₂O

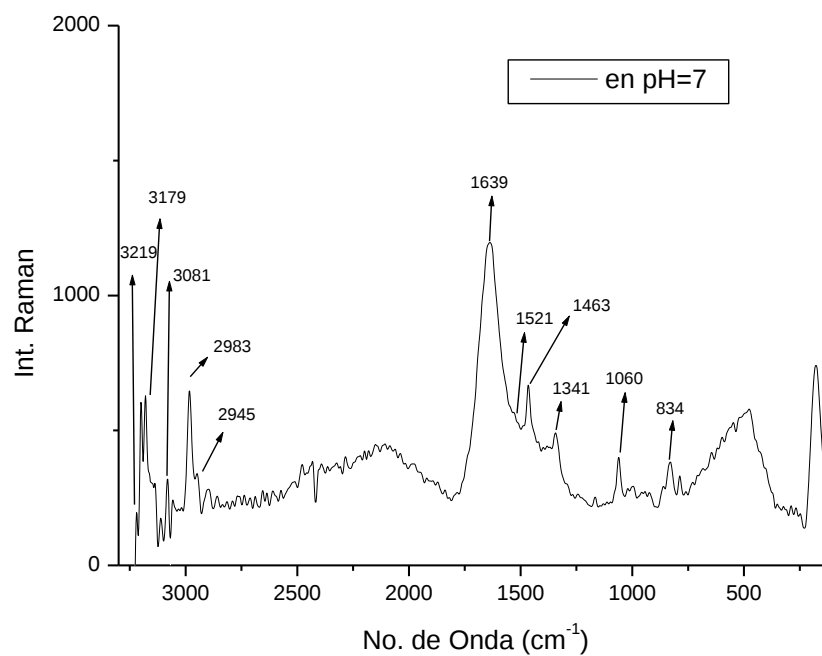


Figura A.3.1.b – Espectro Raman para o ligante en pH=7

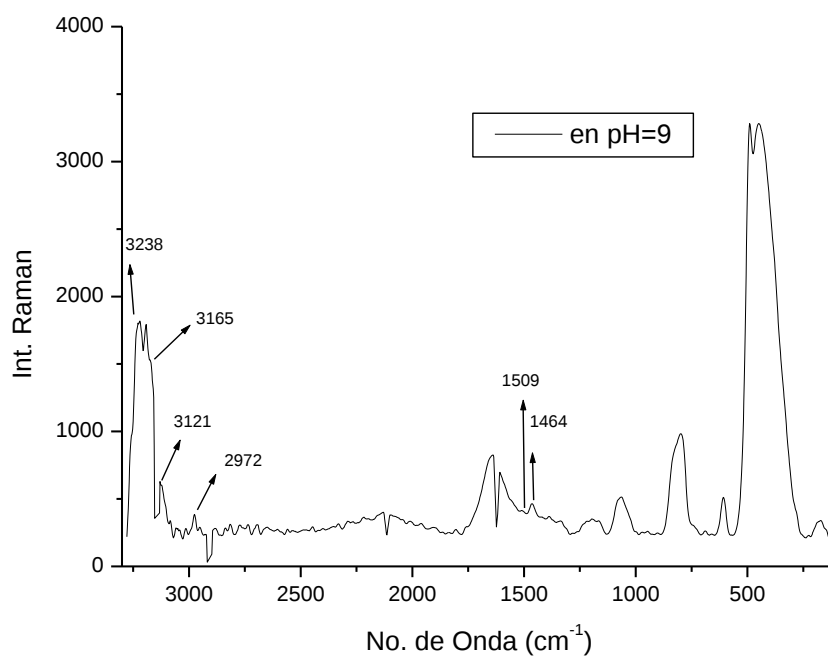


Figura A.3.1.c – Espectro Raman para o ligante en pH=9

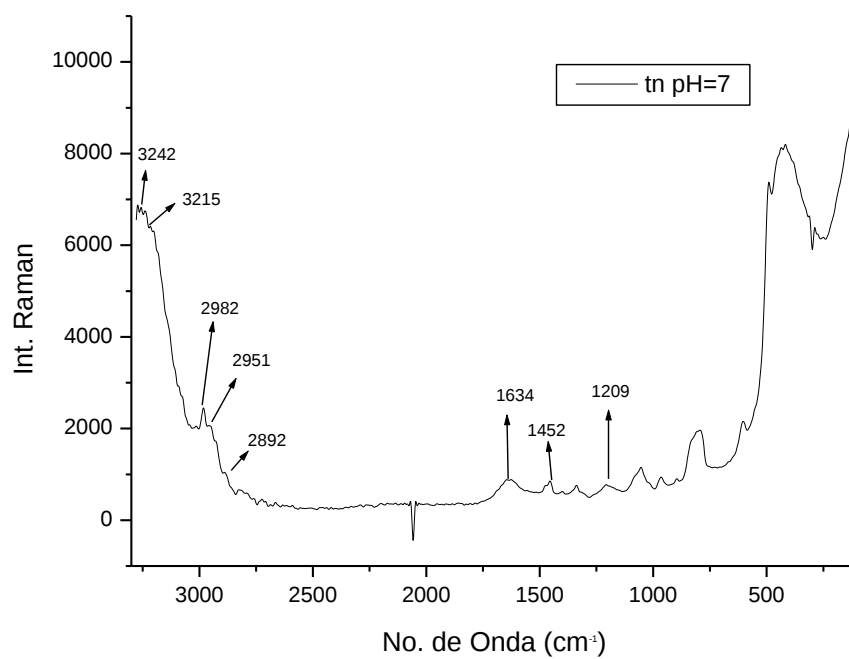


Figura A.3.1.d – Espectro Raman para o ligante tn pH=7

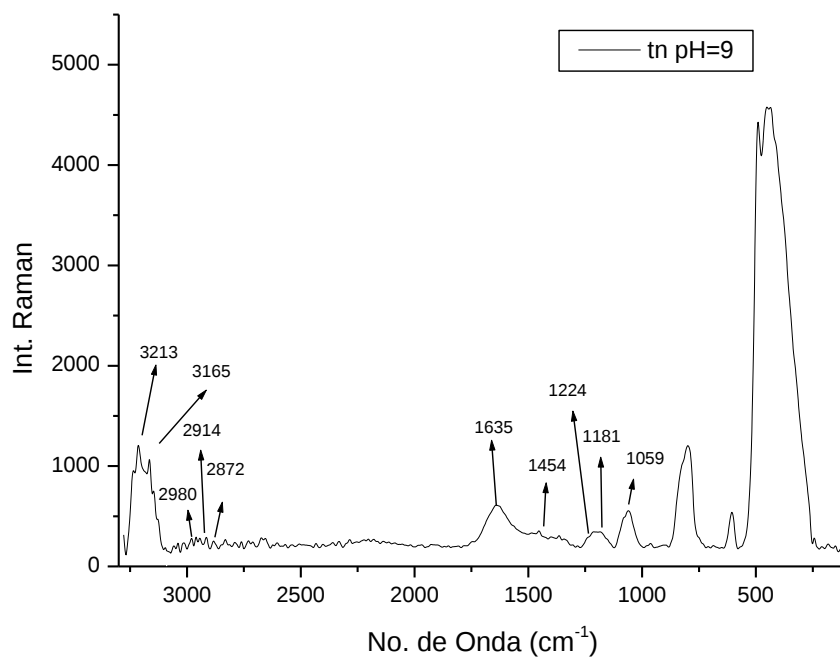


Figura A.3.1.e – Espectro Raman para o ligante tn pH=9

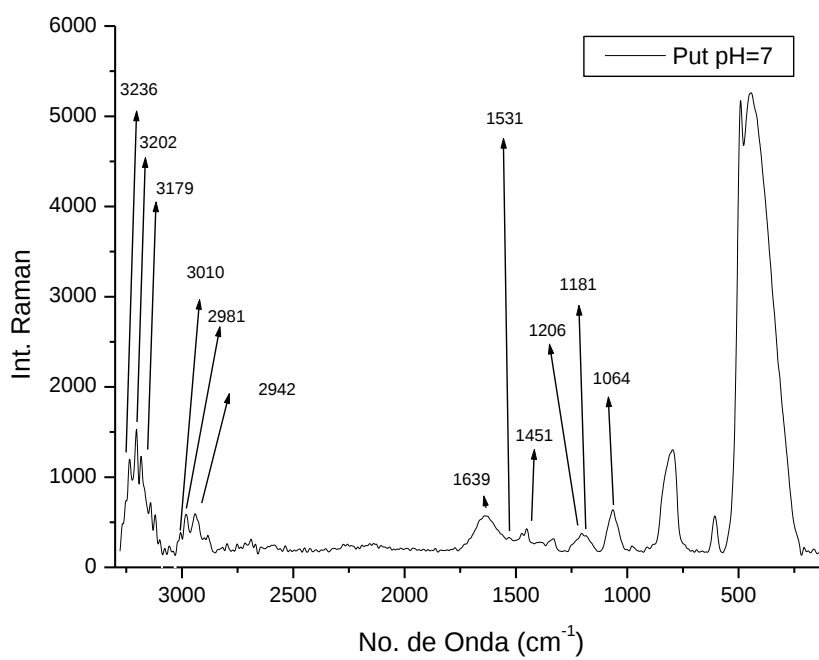


Figura A.3.1.f – Espectro Raman para o ligante Put pH=7

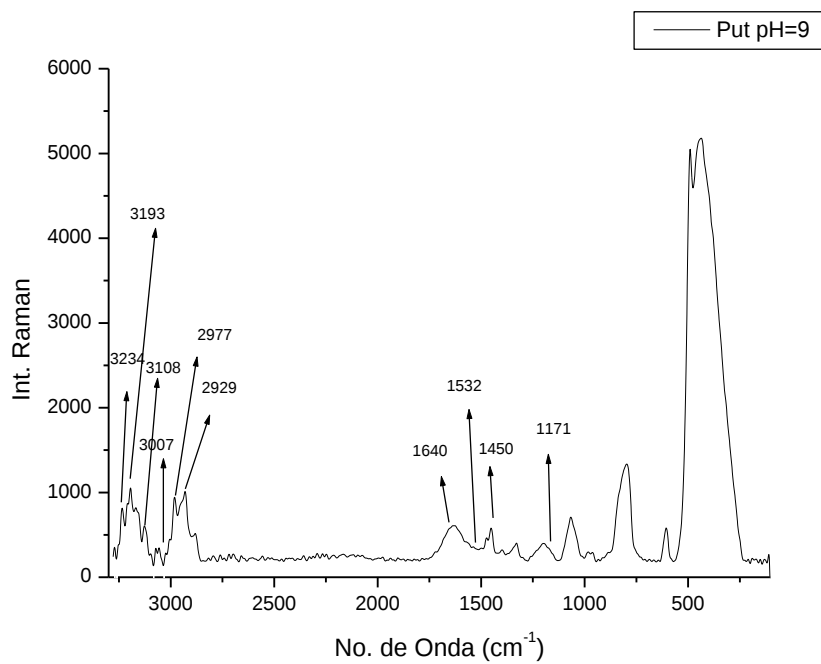


Figura A.3.1.g – Espectro Raman para o ligante Put pH=9

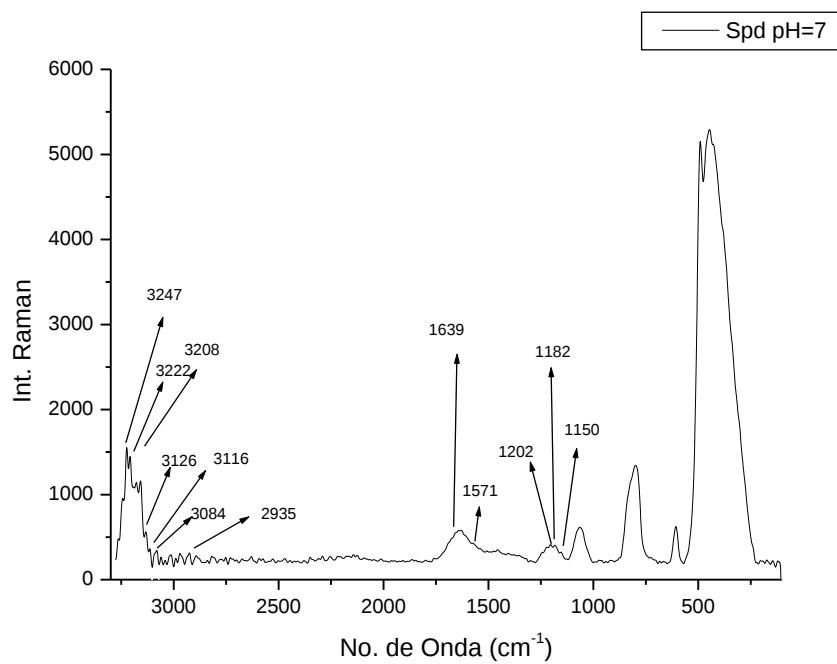


Figura A.3.1.h – Espectro Raman para o ligante Spd pH=7

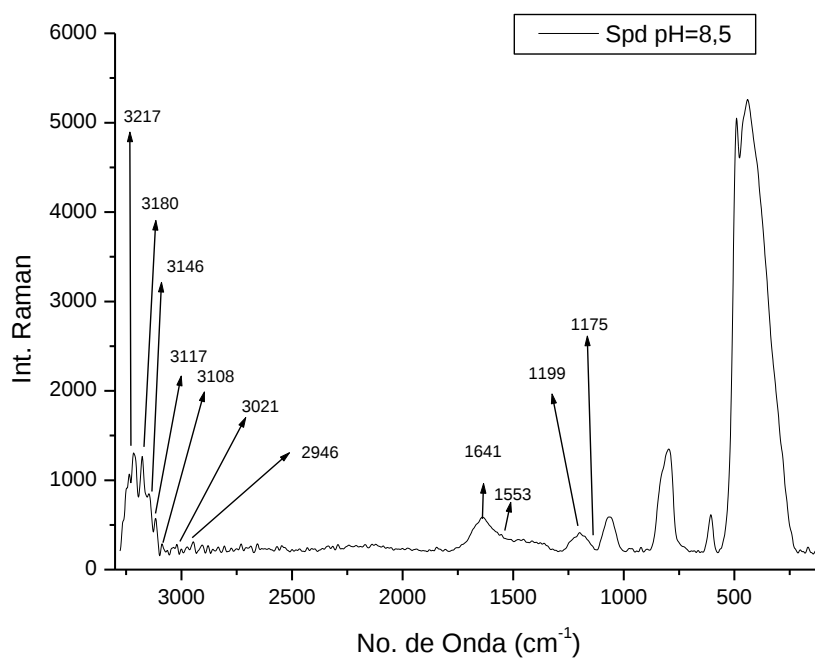


Figura A.3.1.i – Espectro Raman para o ligante Spd pH=9

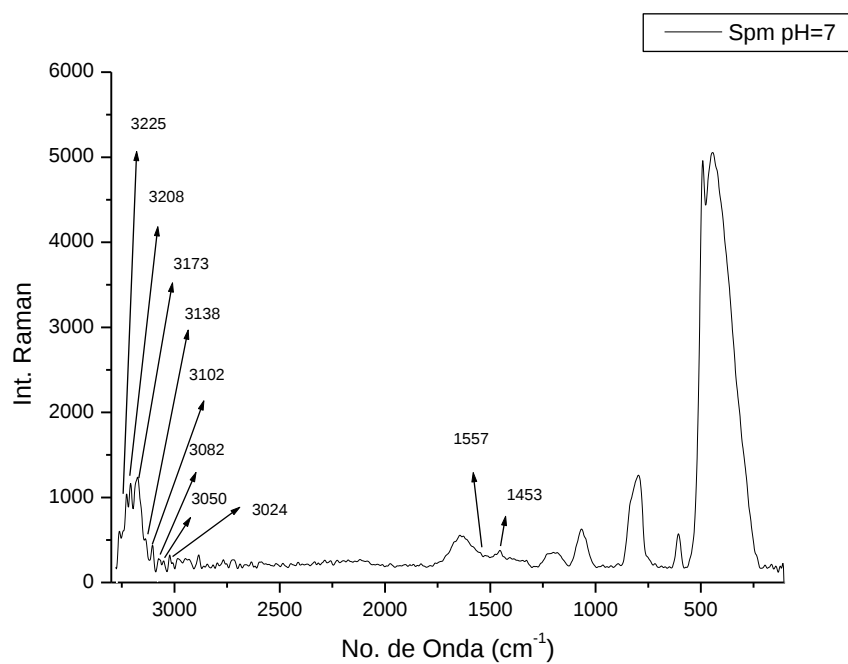


Figura A.3.1.j – Espectro Raman para o ligante Spm pH=7

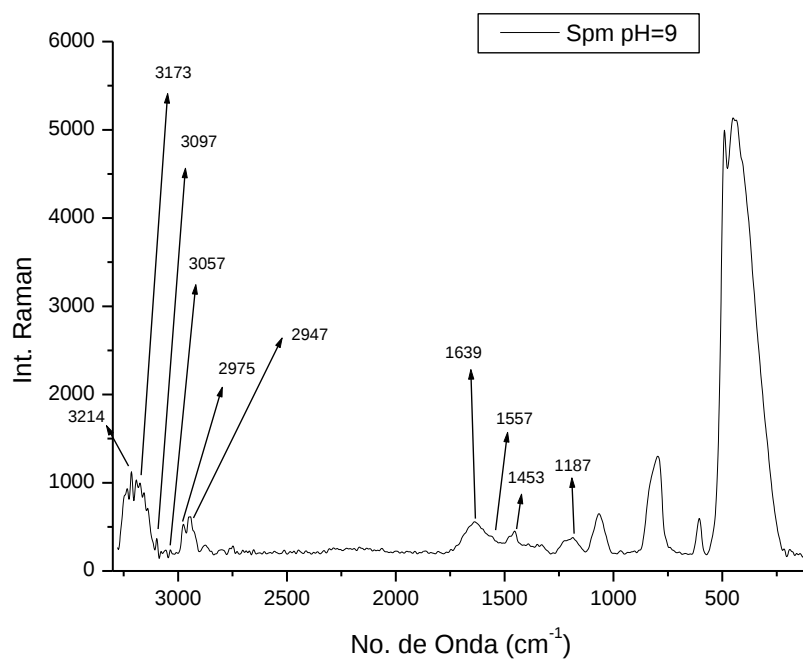


Figura A.3.1.l – Espectro Raman para o ligante Spm pH=9

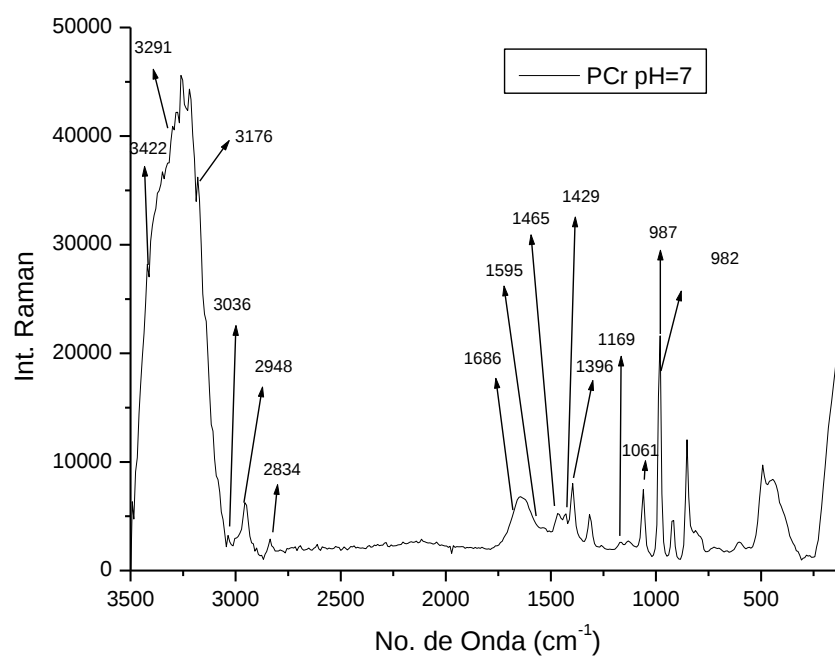


Figura A.3.1.m – Espectro Raman para o ligante PCr pH=7

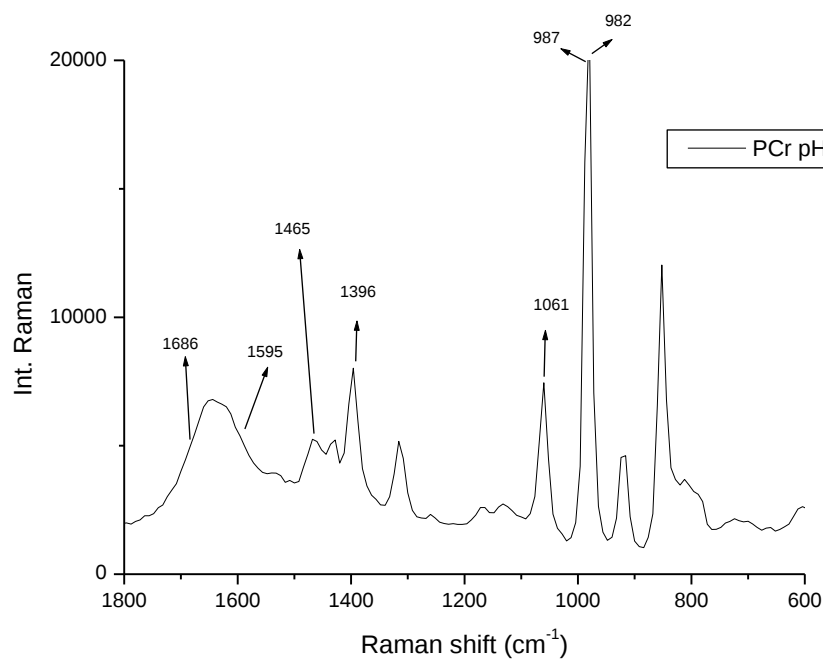


Figura A.3.1.n – Espectro Raman para o ligante PCr pH=7, escala 1800-600 cm^{-1} .

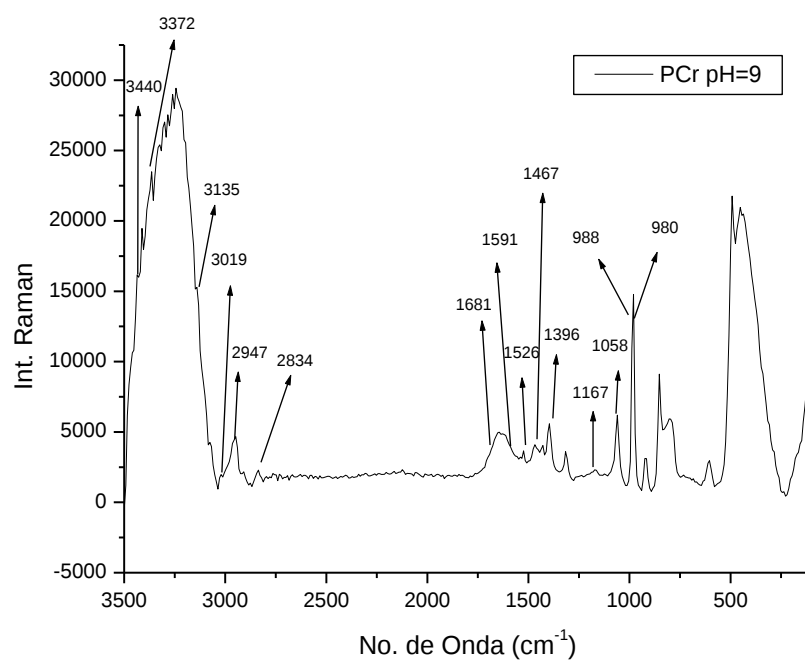


Figura A.3.1.o – Espectro Raman para o ligante PCr pH=9

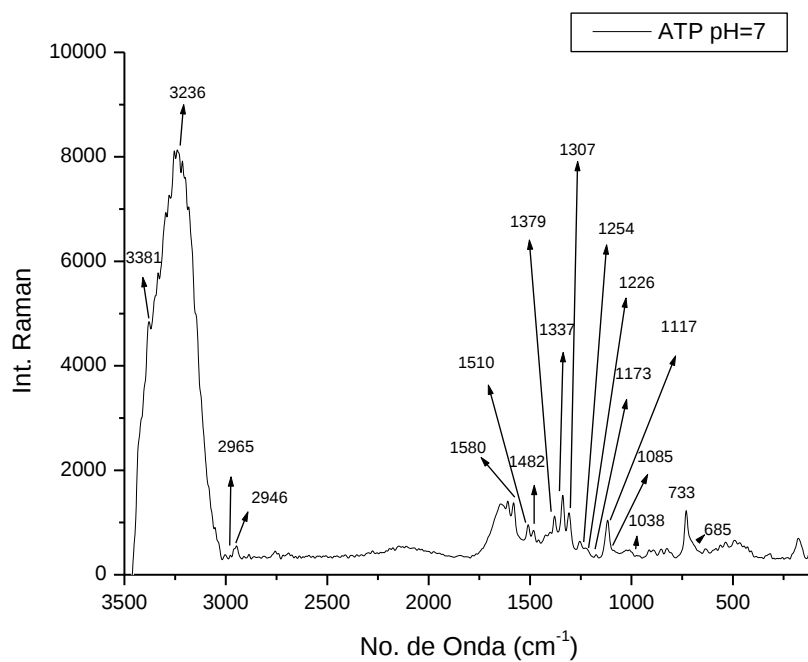


Figura A.3.1.p – Espectro Raman para o ligante ATP pH=7

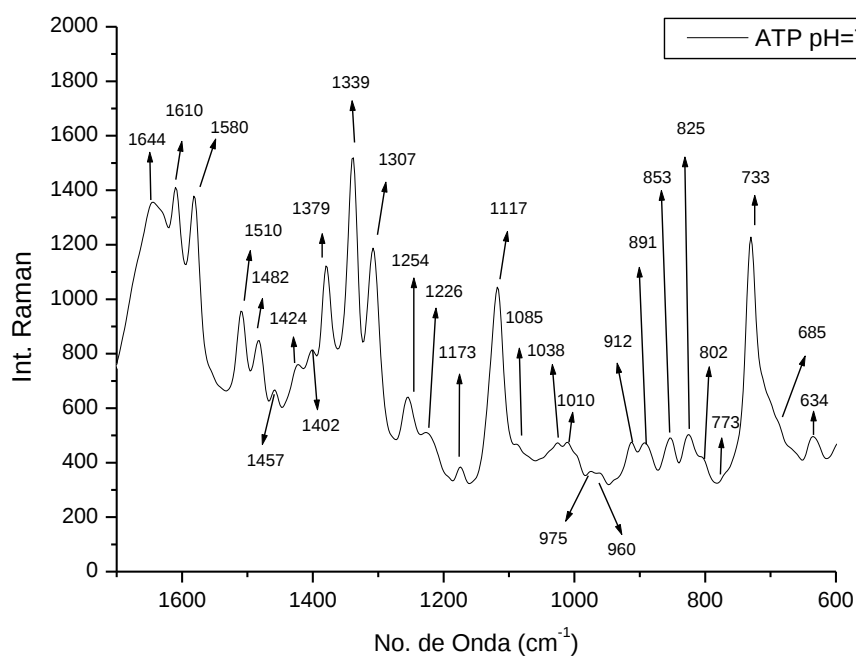


Figura A.3.1.q – Espectro Raman para o ligante ATP pH=7, escala 1700-600 cm^{-1}

A.3.2

Espectros do Raman para os sistemas binários Cu:PA (PA = en, tn, Put, Spd e Spm), Cu:PCr, Cu:ATP, Zn:PA (PA = en, tn, Put, Spd e Spm), Zn:PCr e Zn:ATP

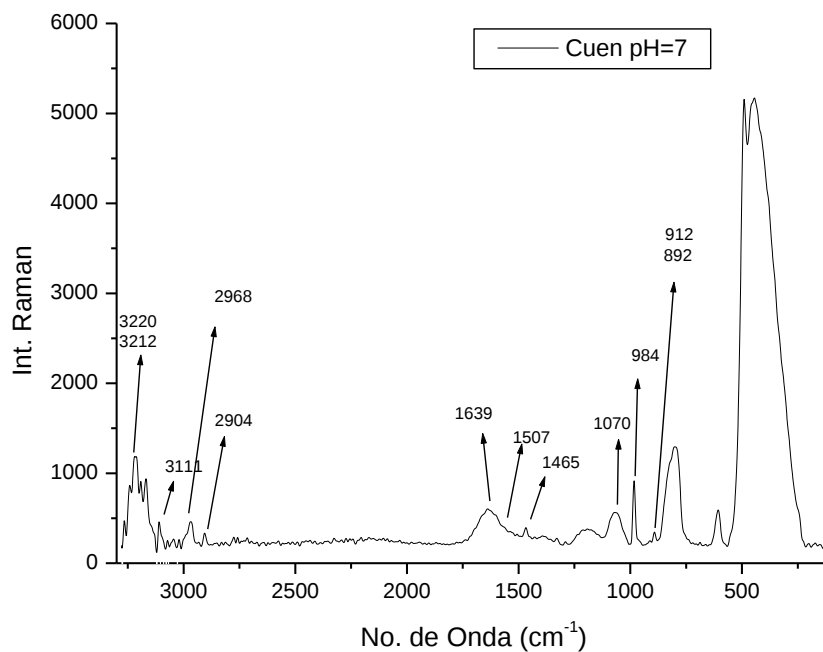


Figura A.3.2.a – Espectro Raman para o sistema Cu:en pH=7, na proporção 1:1.

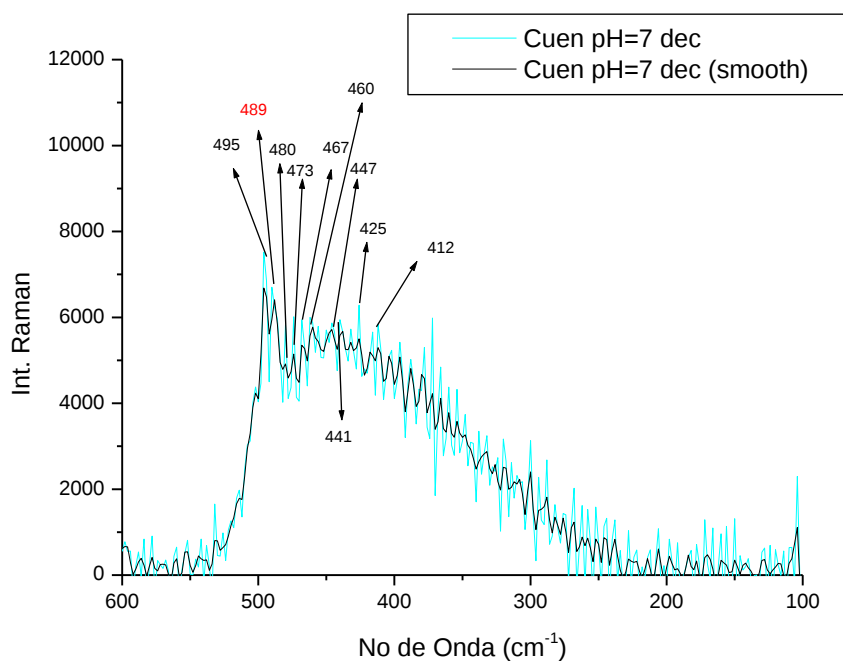


Figura A.3.2.b – Espectro Raman para o sistema Cu:en pH=7, na proporção 1:1, escala 600-100 cm^{-1} .

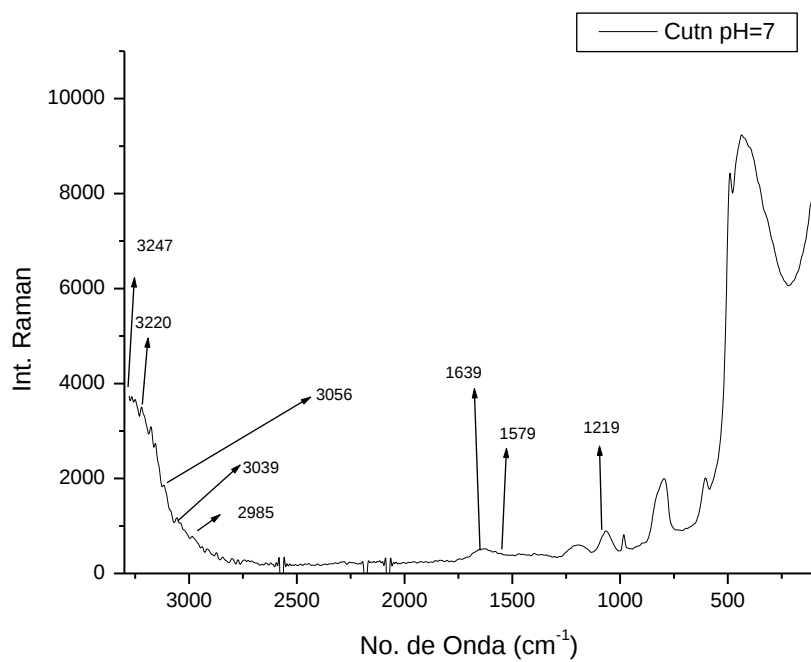


Figura A.3.2.c – Espectro Raman para o sistema Cu:tn pH=7, na proporção 1:1.

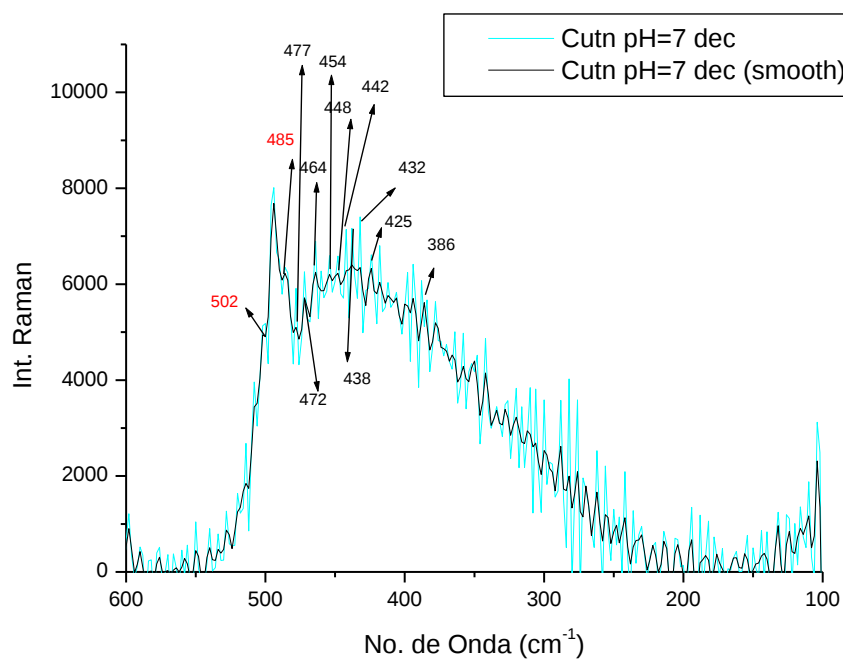


Figura A.3.2.d – Espectro Raman para o sistema Cu:tn pH=7, na proporção 1:1, escala 600-100 cm^{-1} .

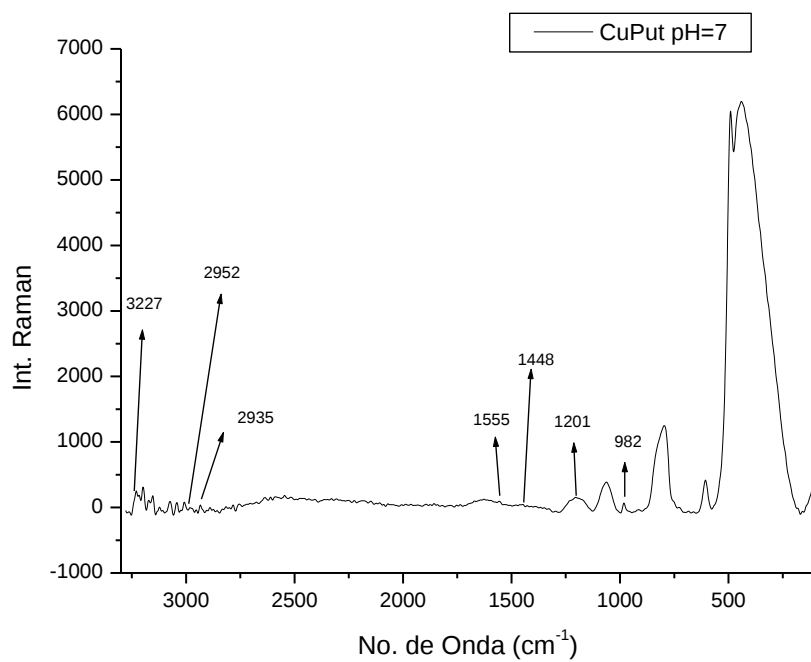


Figura A.3.2.e – Espectro Raman para o sistema Cu:Put pH=7, na proporção 1:1.

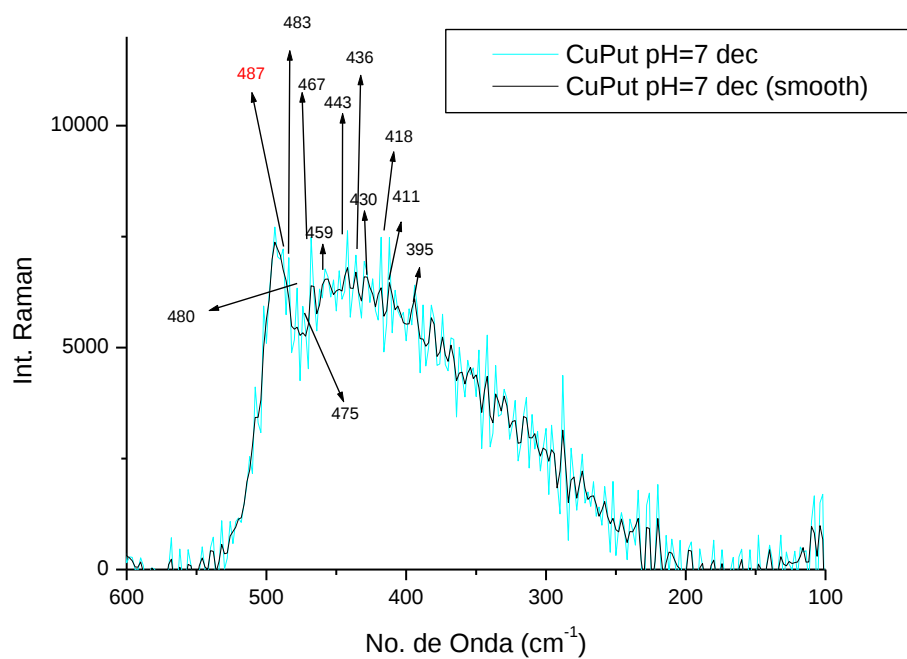


Figura A.3.2.f – Espectro Raman para o sistema Cu:Put pH=7, na proporção 1:1, escala 600-100 cm^{-1} .

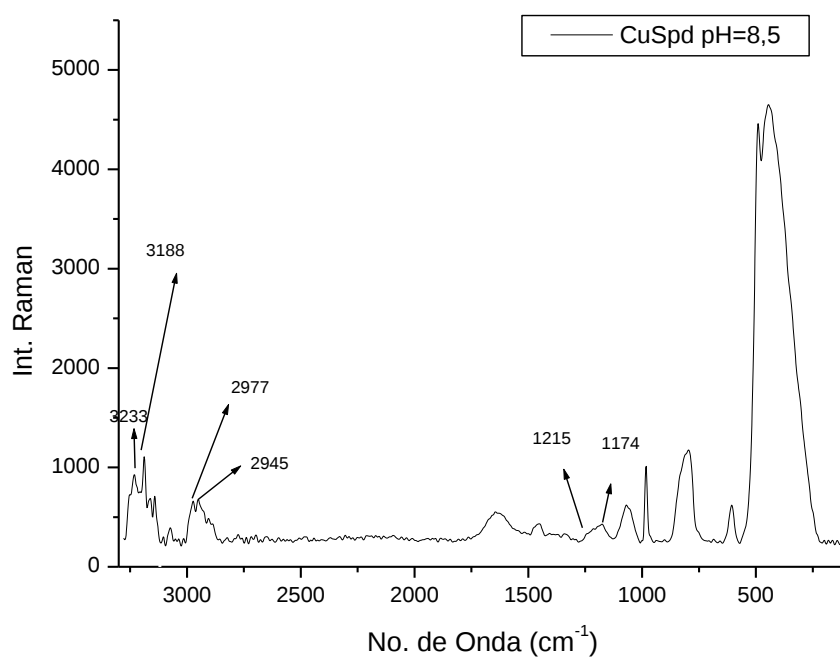


Figura A.3.2.g – Espectro Raman para o sistema Cu:Spd pH=8,5, na proporção 1:1.

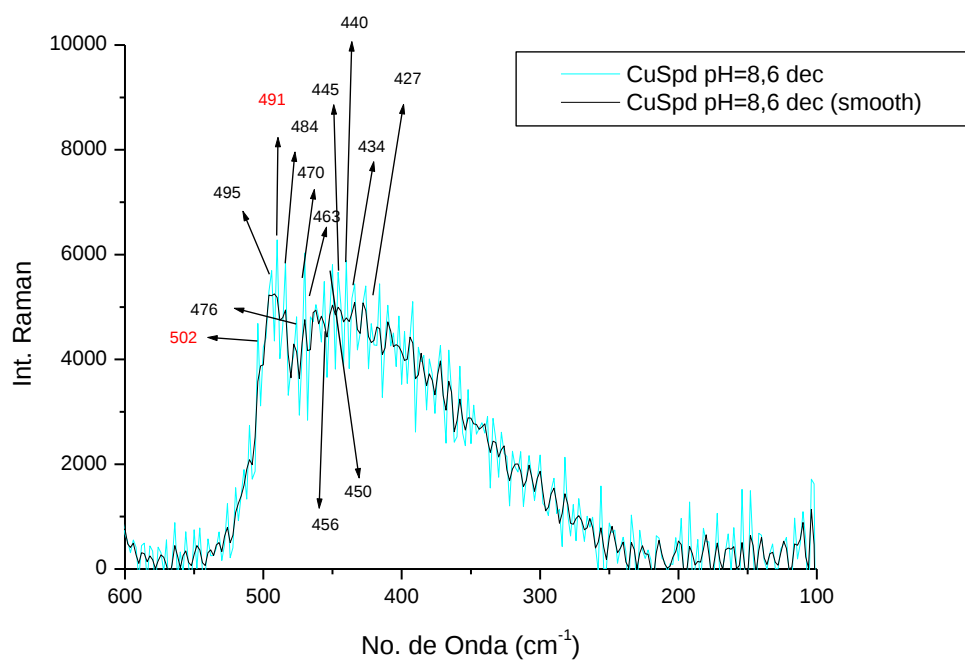


Figura A.3.2.h – Espectro Raman para o sistema Cu:Spd pH=8,5, na proporção 1:1, escala 600-100 cm^{-1} .

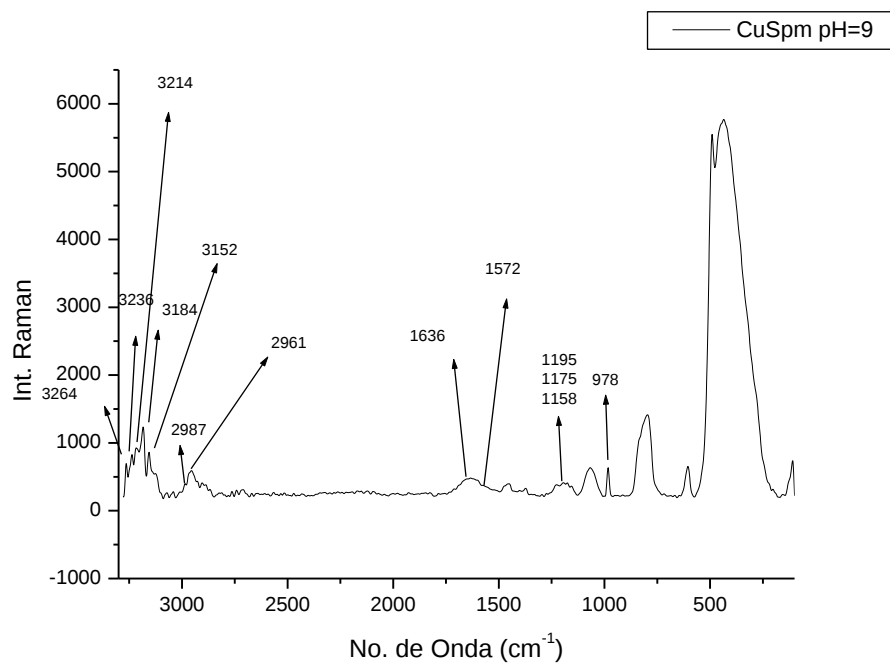


Figura A.3.2.i – Espectro Raman para o sistema Cu:Spm pH=9, na proporção 1:1.

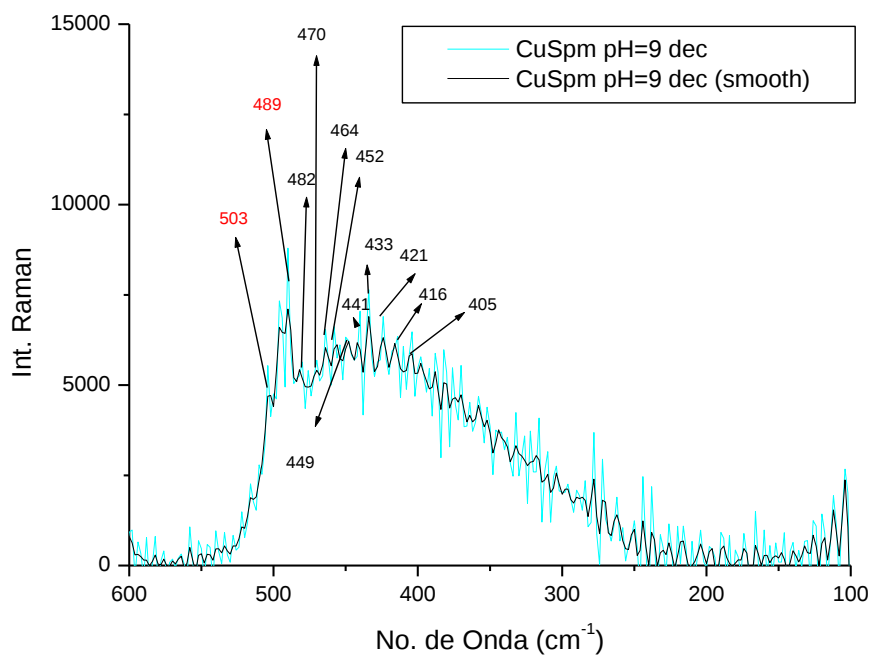


Figura A.3.2.j – Espectro Raman para o sistema Cu:Spm pH=9, na proporção 1:1, escala 600-100 cm^{-1} .

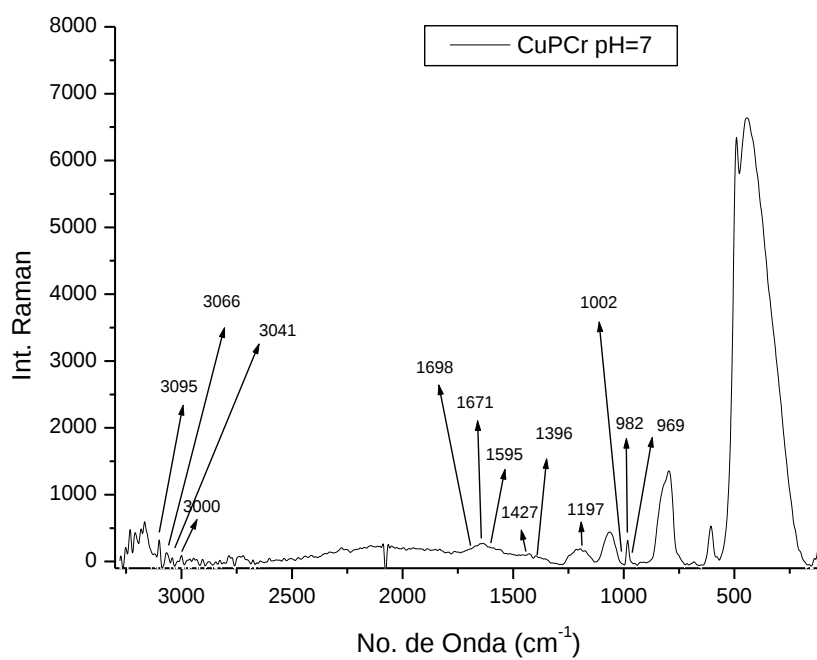


Figura A.3.2.l – Espectro Raman para o sistema Cu:PCr pH=7, na proporção 1:1.

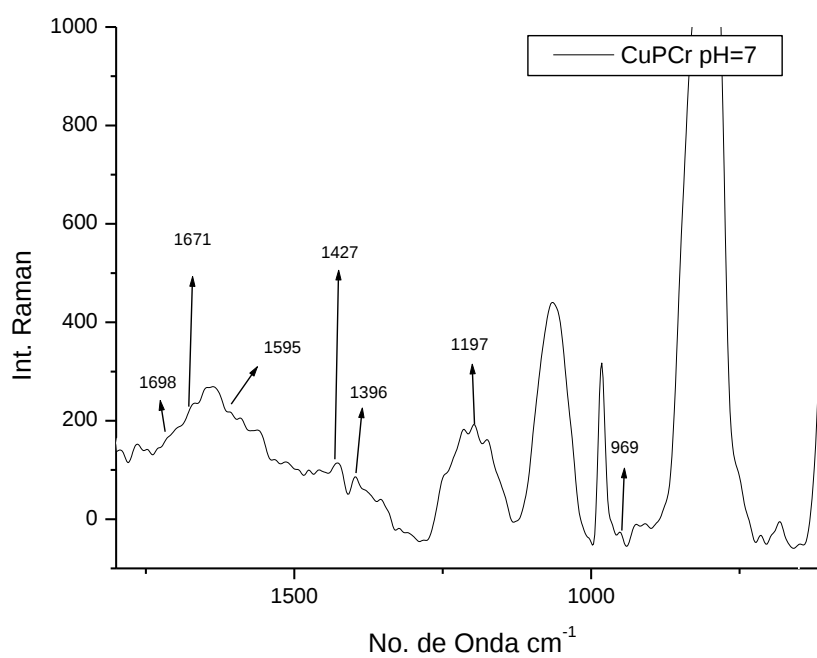


Figura A.3.2.m – Espectro Raman para o sistema Cu:PCr pH=7, na proporção 1:1, escala 1800-600 cm^{-1} .

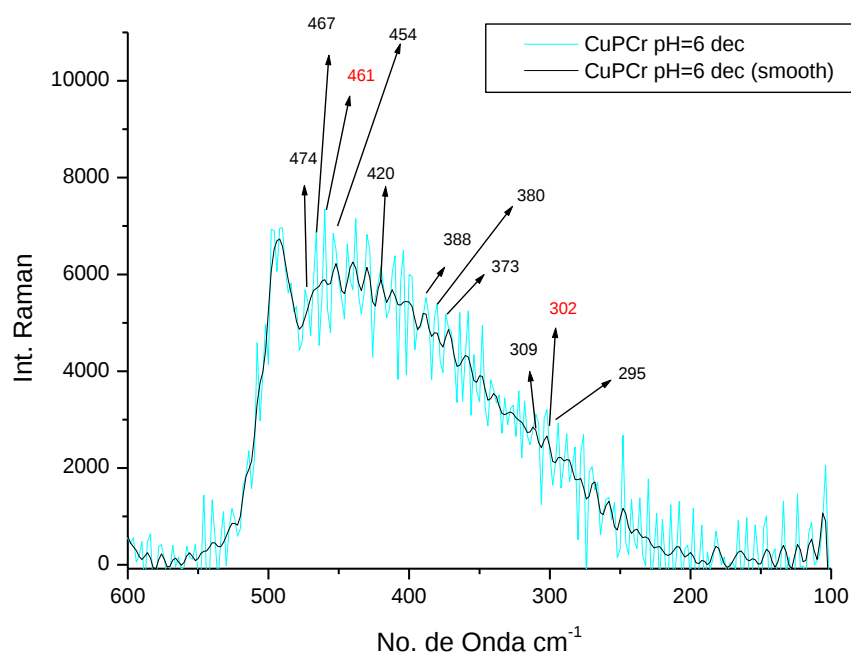


Figura A.3.2.n – Espectro Raman para o sistema Cu:PCr pH=7, na proporção 1:1, escala 600-100 cm^{-1}

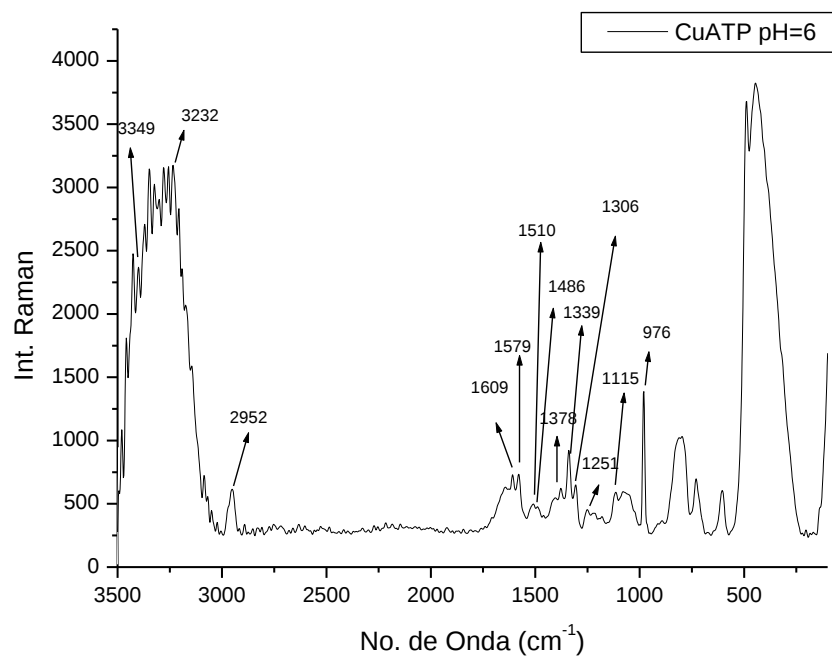


Figura A.3.2.o – Espectro Raman para o sistema Cu:ATP pH=6, na proporção 1:1.

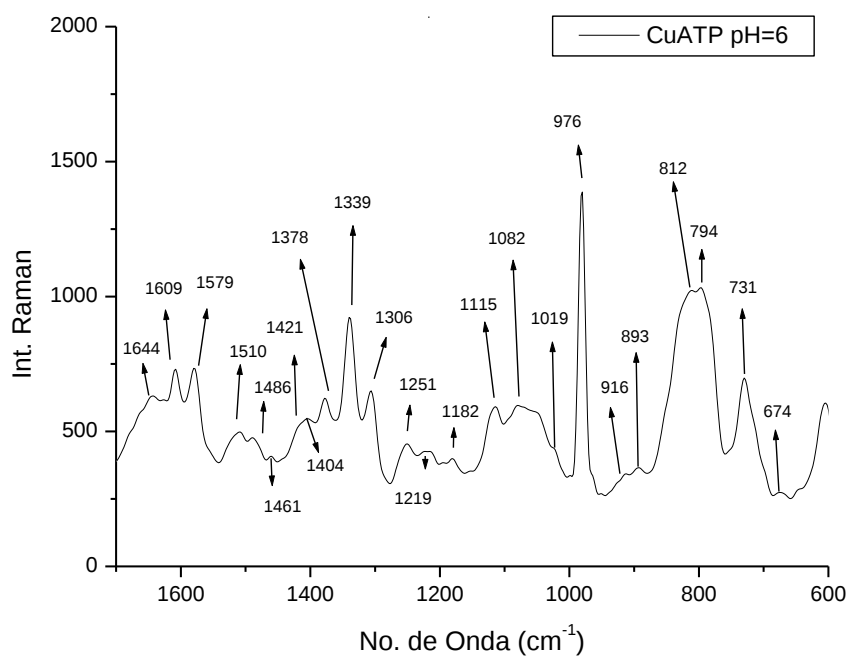


Figura A.3.2.p – Espectro Raman para o sistema Cu:ATP pH=6, na proporção 1:1, escala 1700-600 cm^{-1} .

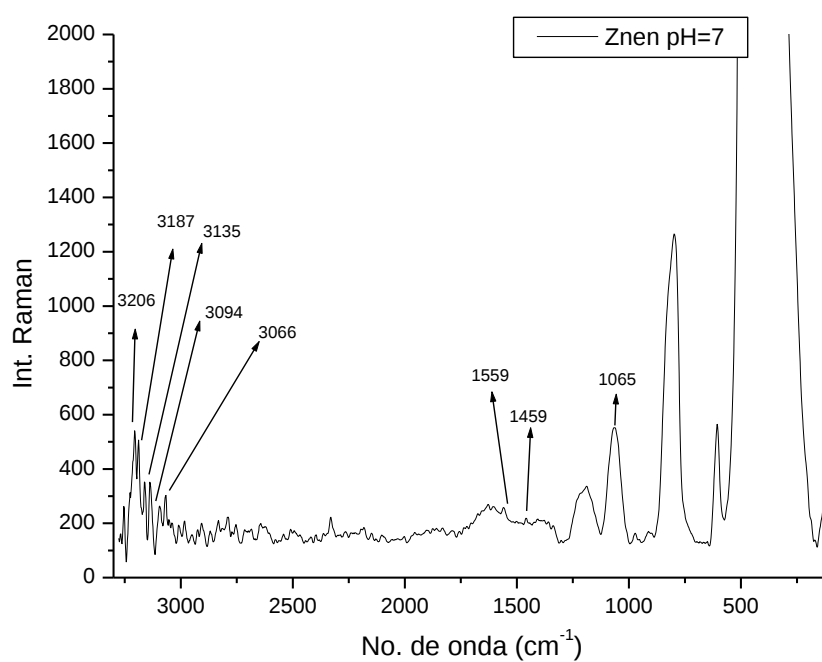


Figura A.3.2.q – Espectro Raman para o sistema Zn:en pH=7, na proporção 1:1.

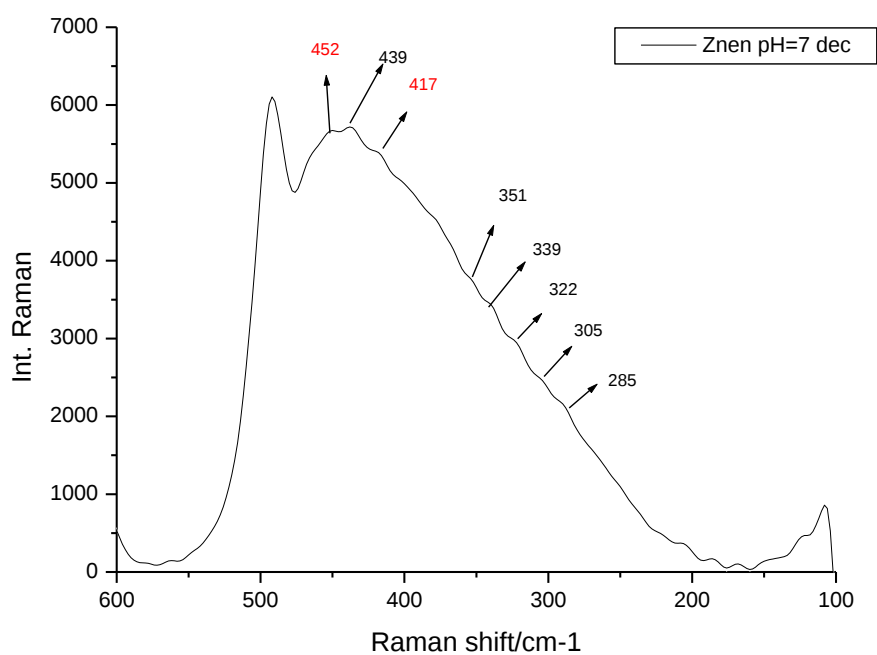


Figura A.3.2.r – Espectro Raman para o sistema Zn:en pH=7, na proporção 1:1, escala 600-100 cm^{-1} .

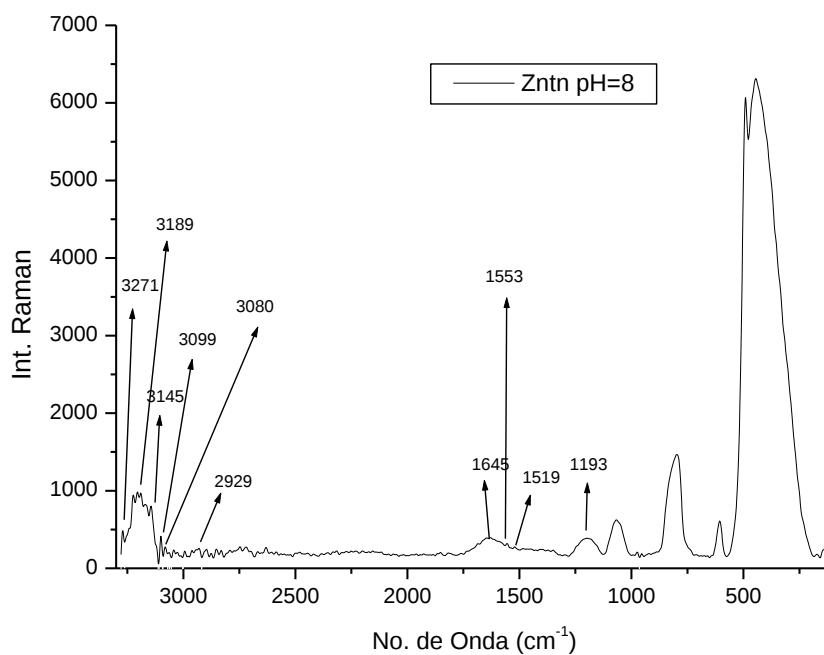


Figura A.3.2.s – Espectro Raman para o sistema Zn:tn pH=8, na proporção 1:1.

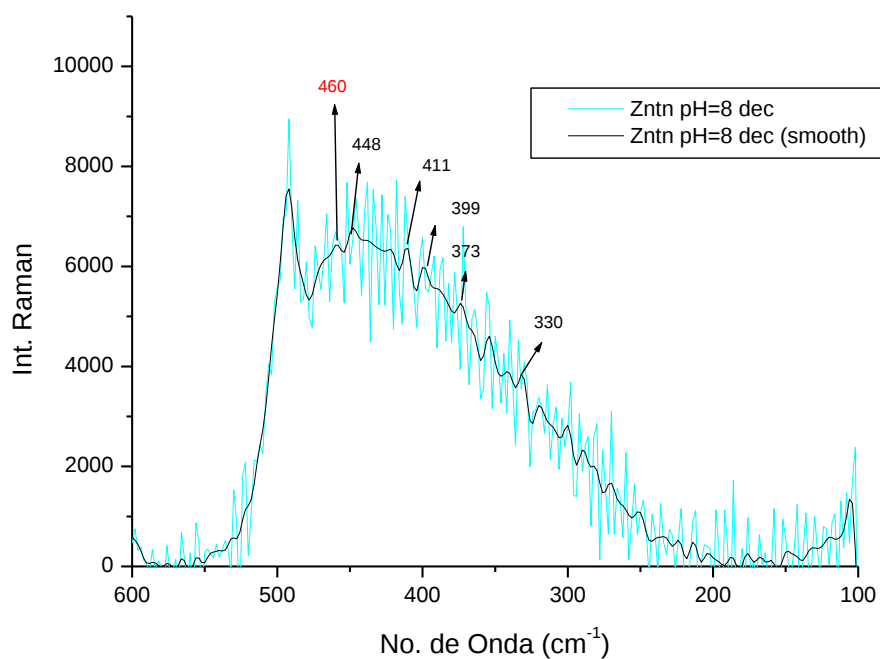


Figura A.3.2.t – Espectro Raman para o sistema Zn:tn pH=8, na proporção 1:1, escala 600-100 cm^{-1} .

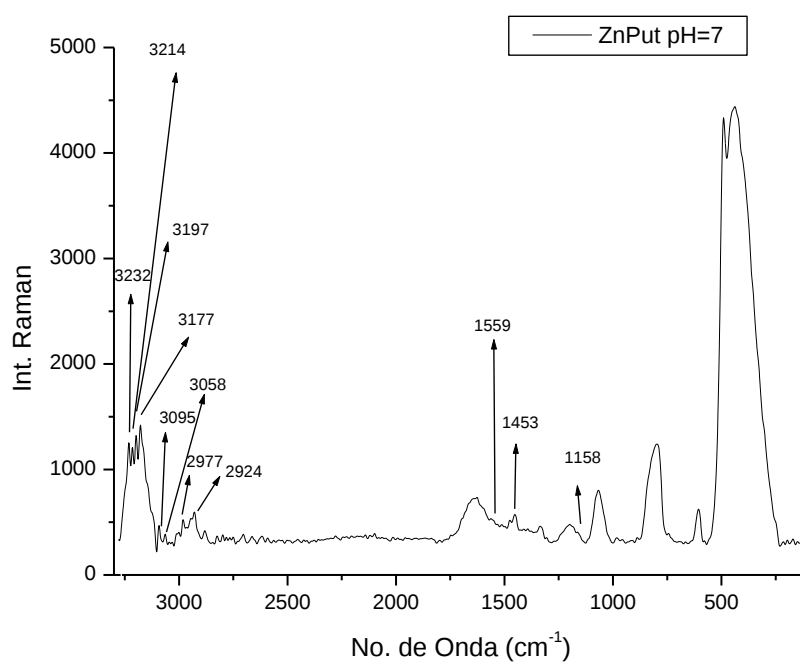


Figura A.3.2.u – Espectro Raman para o sistema Zn:Put pH=7, na proporção 1:1.

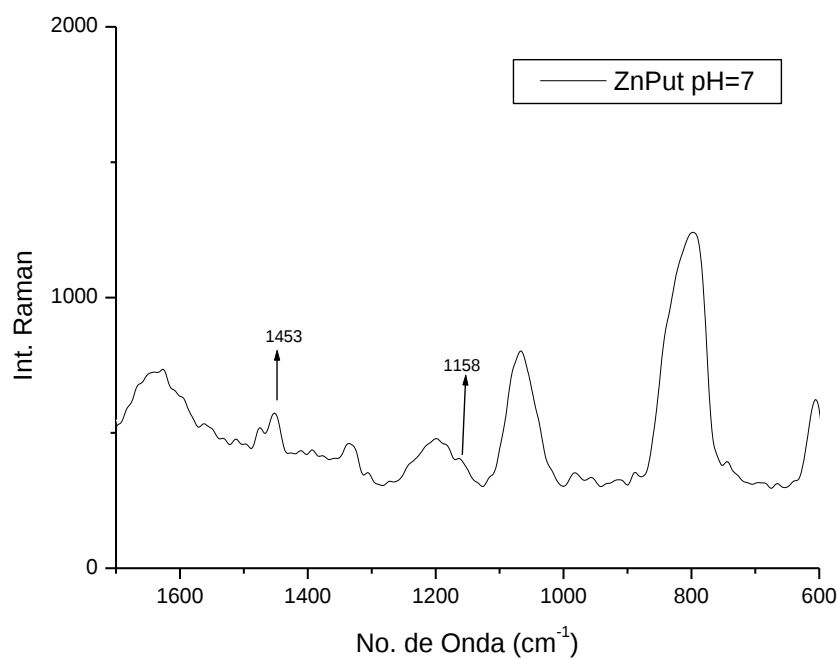


Figura A.3.2.v – Espectro Raman para o sistema Zn:Put pH=7, na proporção 1:1, escala 1700-600 cm^{-1} .

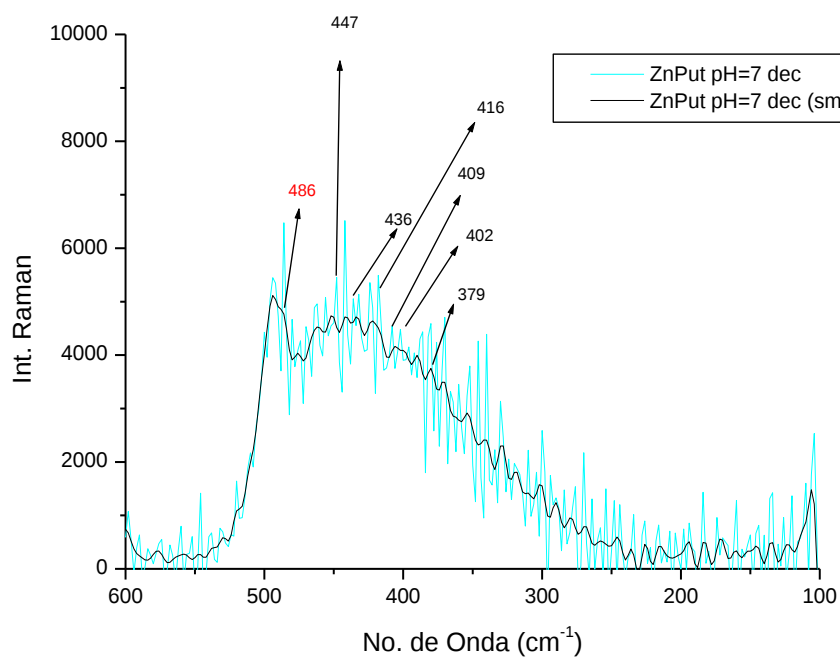


Figura A.3.2.x – Espectro Raman para o sistema Zn:Put pH=7, na proporção 1:1, escala 600-100 cm^{-1} .

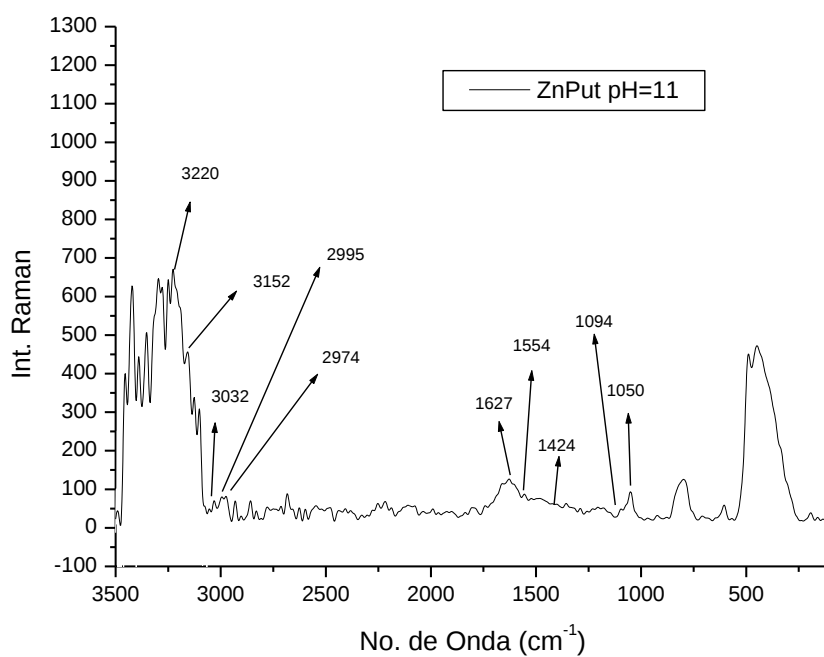


Figura A.3.2.z– Espectro Raman para o sistema Zn:Put pH=11, na proporção 1:1.

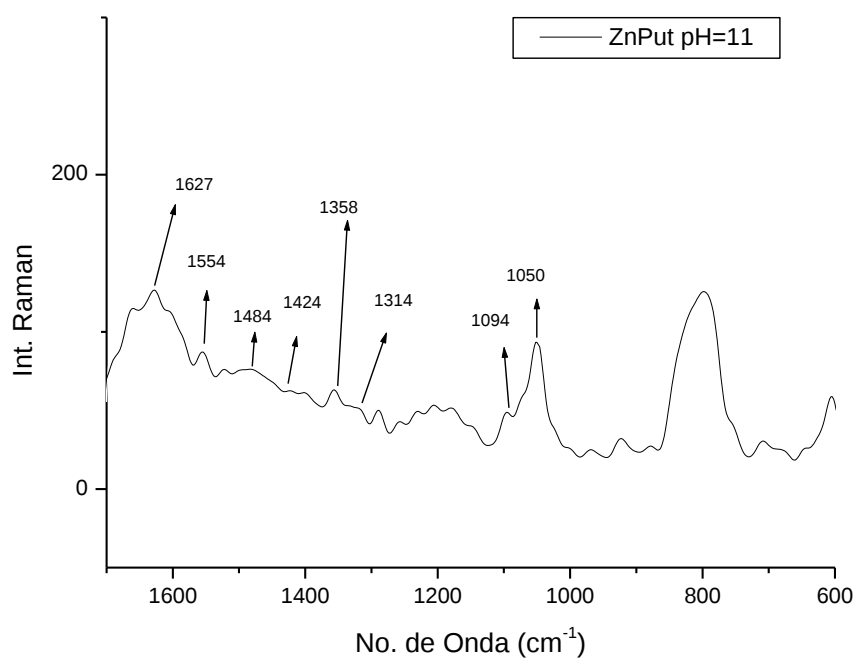


Figura A.3.2.aa – Espectro Raman para o sistema Zn:Put pH=11, na proporção 1:1, escala 1700-600 cm^{-1} .

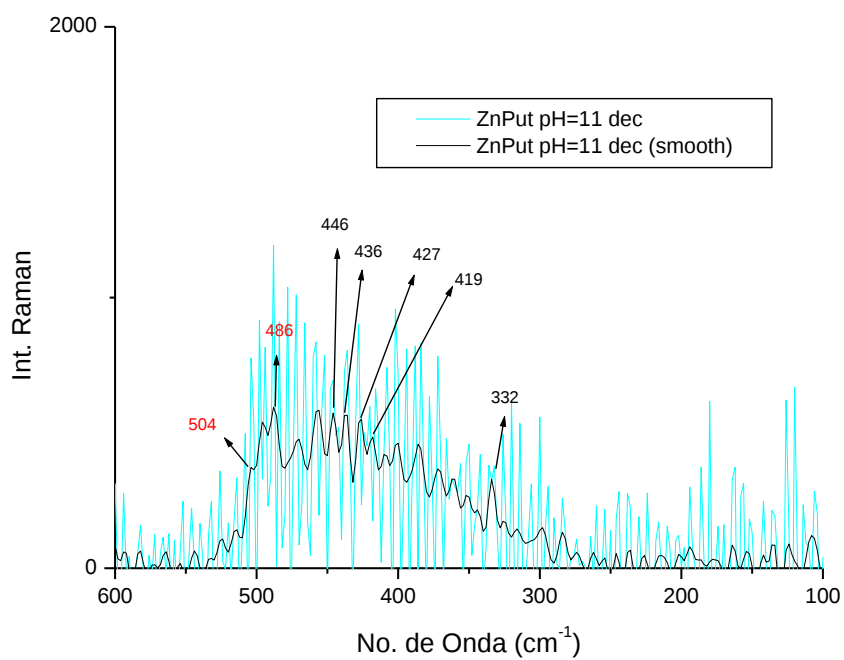


Figura A.3.2.bb – Espectro Raman para o sistema Zn:Put pH=11, na proporção 1:1, escala 600-100 cm⁻¹.

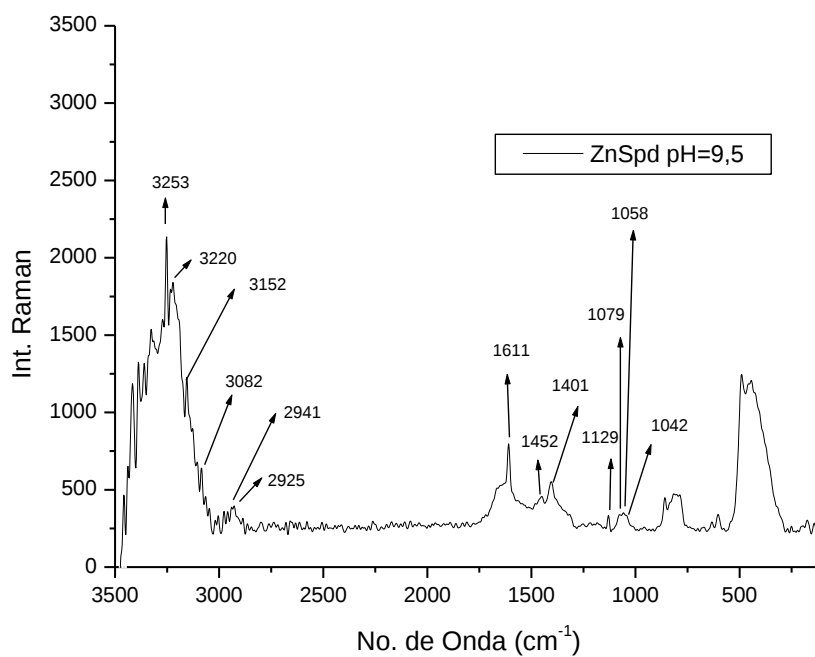


Figura A.3.2.cc – Espectro Raman para o sistema Zn:Spd pH=9,5, na proporção 1:1.

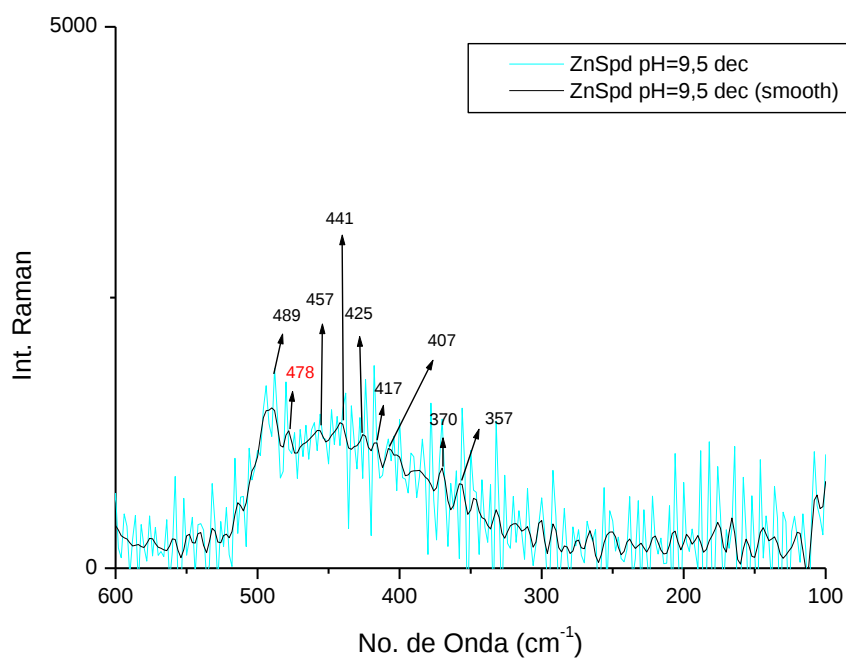


Figura A.3.2.dd – Espectro Raman para o sistema Zn:Spd pH=9,5, na proporção 1:1, escala 600-100 cm^{-1} .

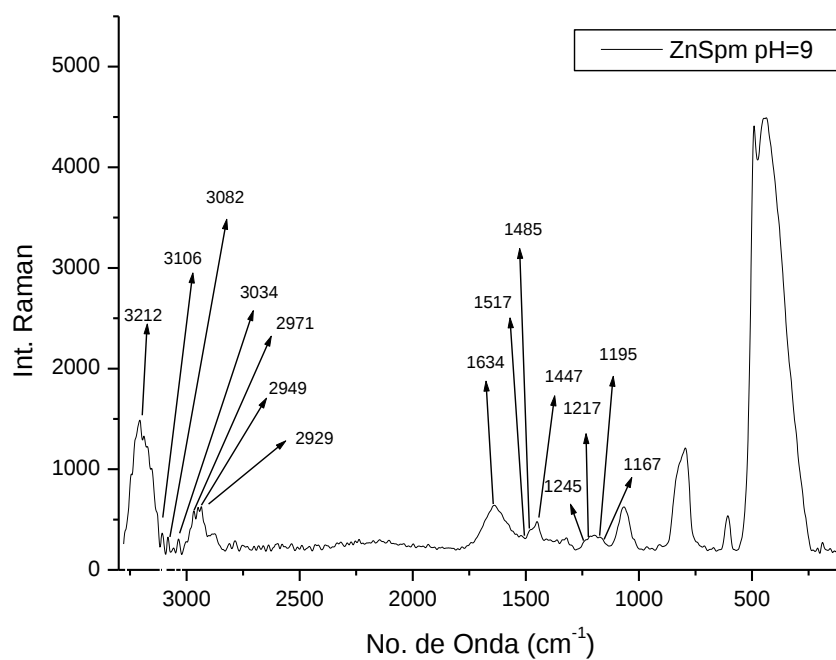


Figura A.3.2.ee – Espectro Raman para o sistema Zn:Spm pH=9, na proporção 1:1.

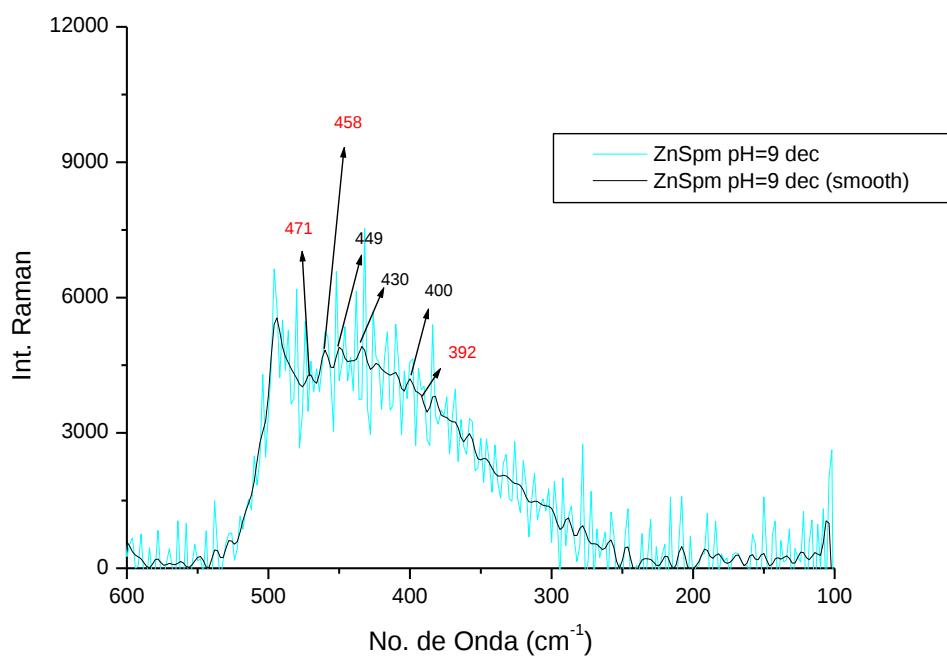


Figura A.3.2.ff – Espectro Raman para o sistema Zn:Spm pH=9, na proporção 1:1, escala 600-100 cm^{-1} .

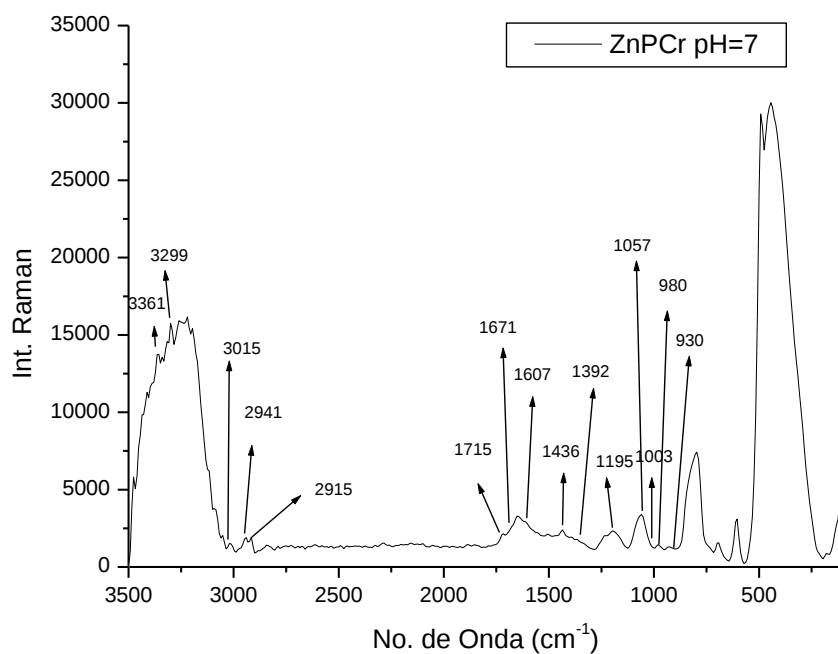


Figura A.3.2.gg – Espectro Raman para o sistema Zn:PCr pH=7, na proporção 1:1.

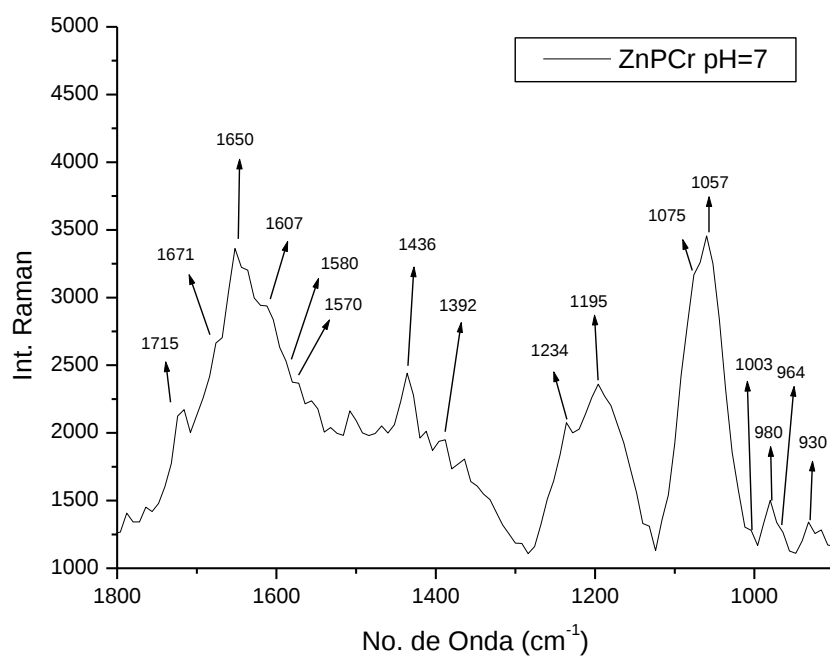


Figura A.3.2.hh – Espectro Raman para o sistema Zn:PCr pH=7, na proporção 1:1, escala 1800-600 cm^{-1}

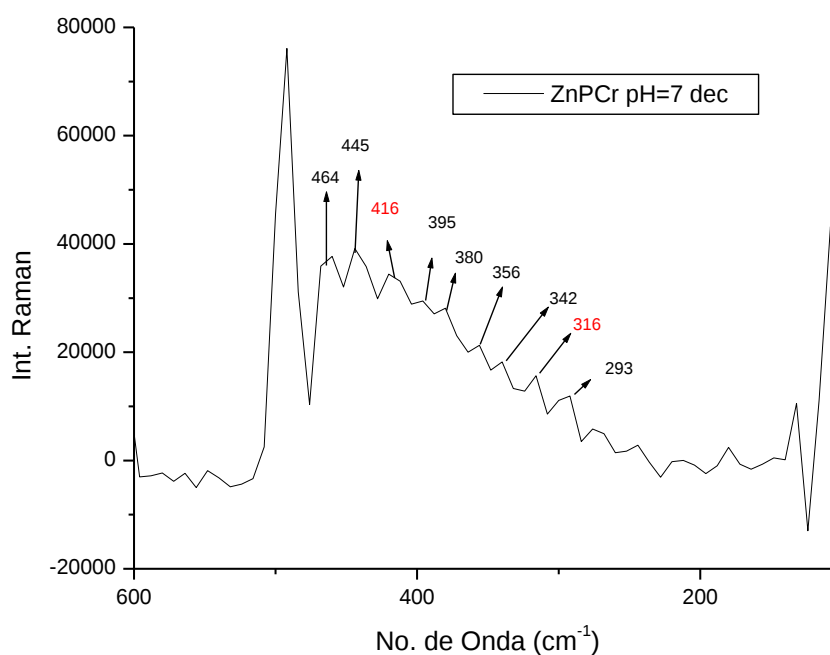


Figura A.3.2.ii – Espectro Raman para o sistema Zn:PCr pH=7, na proporção 1:1, escala 600-100 cm^{-1}

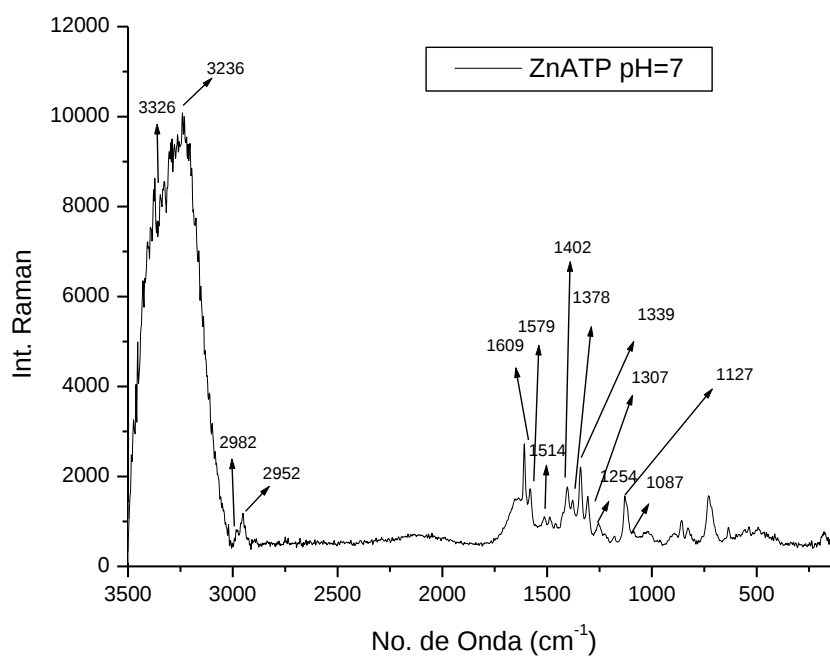


Figura A.3.2.jj – Espectro Raman para o sistema Zn:ATP pH=7, na proporção 1:1.

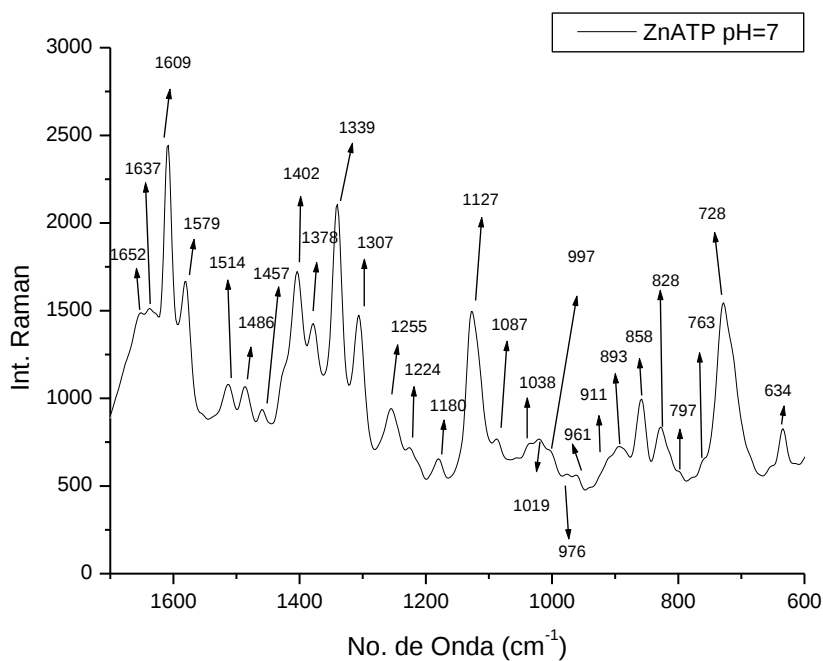


Figura A.3.2.ii – Espectro Raman para o sistema Zn:ATP pH=7, na proporção 1:1, escala 1700-600 cm^{-1} .

A.3.3

Espectros do Raman para os sistemas ternários Cu:PCr:PA (PA=en, tn, Put, Spd e Spm)

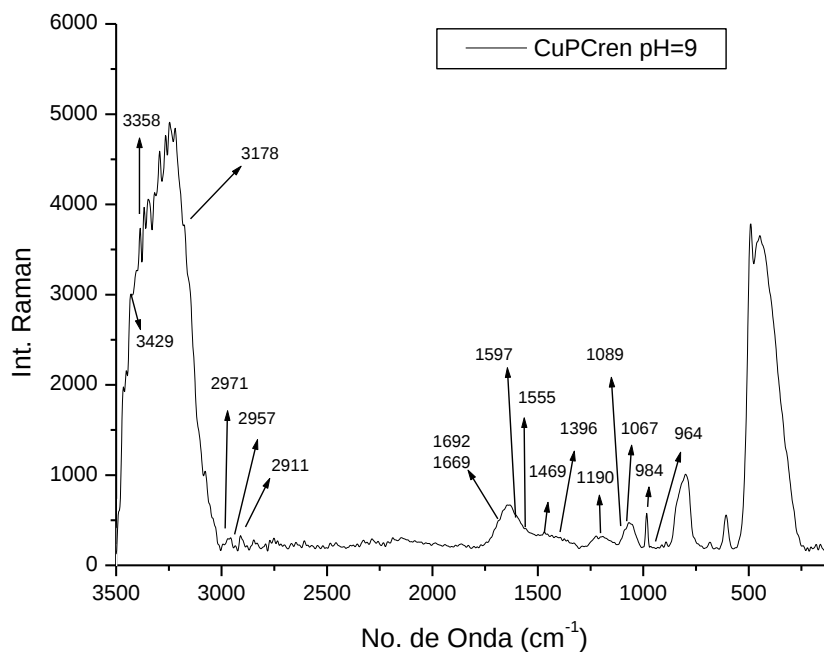


Figura A.3.3.a – Espectro Raman para o sistema Cu:PCr:en pH=9, na proporção 1:1:1.

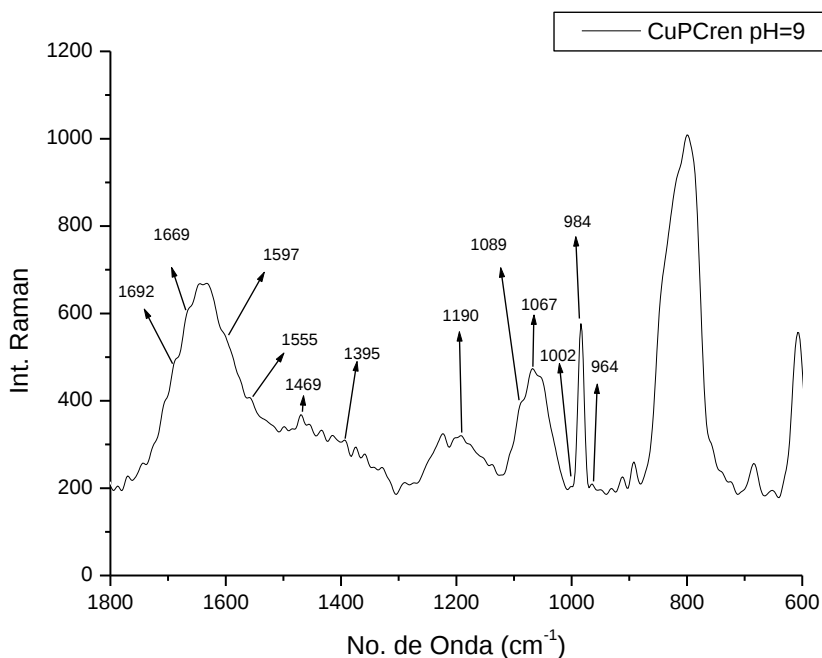


Figura A.3.3.b – Espectro Raman para o sistema Cu:PCr:en pH=9, na proporção 1:1:1, escala 1800-600 cm⁻¹.

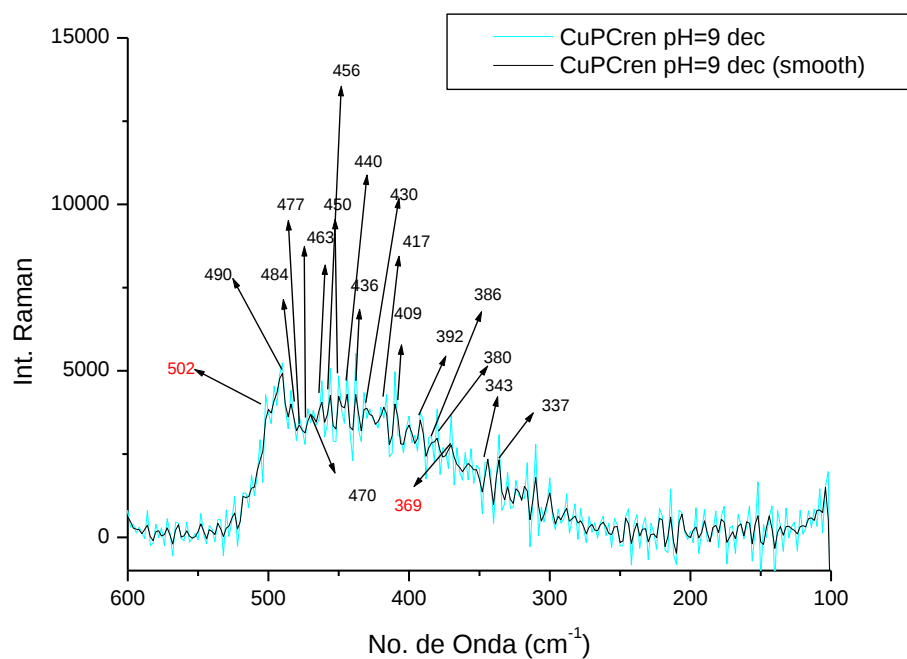


Figura A.3.3.c – Espectro Raman para o sistema Cu:PCr:en pH=9, na proporção 1:1:1, escala 600-100 cm^{-1} .

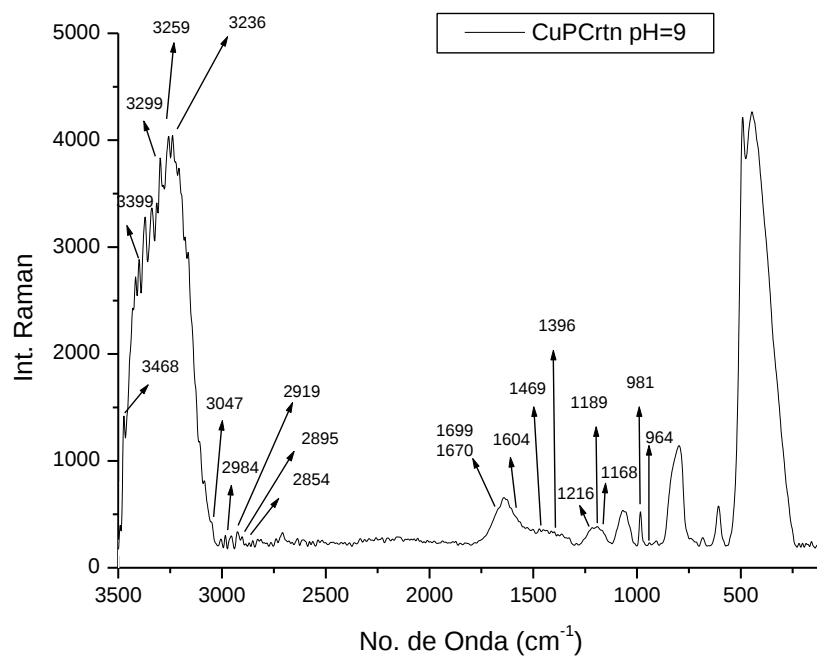


Figura A.3.3.d – Espectro Raman para o sistema Cu:PCr:tn pH=9, na proporção 1:1:1.

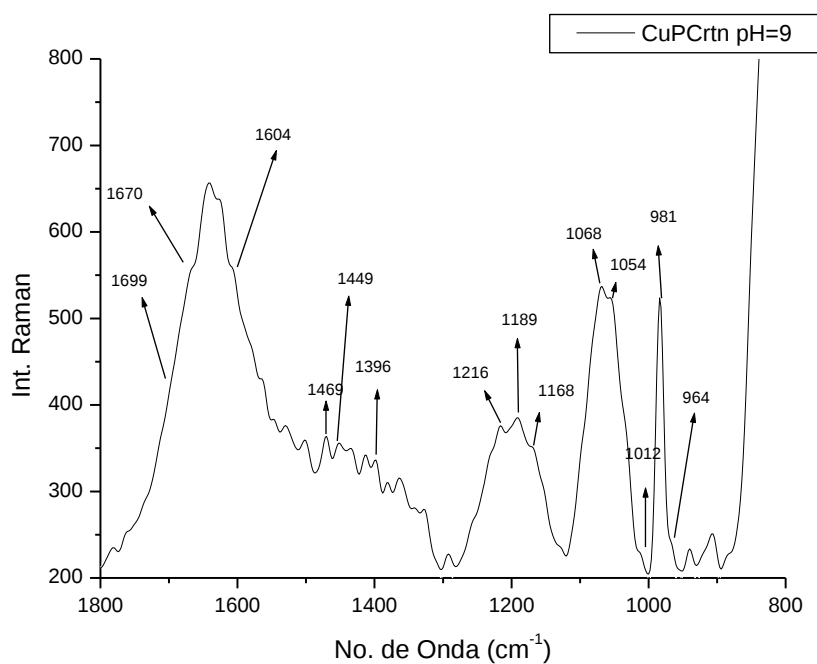


Figura A.3.3.e – Espectro Raman para o sistema Cu:PCr:tn pH=9, na proporção 1:1:1, escala 1800-600 cm^{-1} .

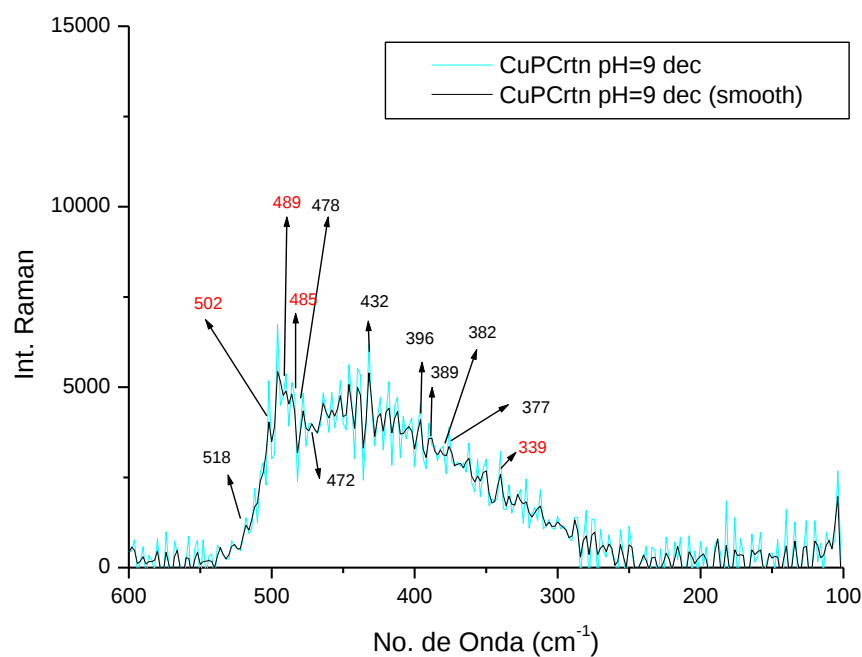


Figura A.3.3.f – Espectro Raman para o sistema Cu:PCr:tn pH=9, na proporção 1:1:1, escala 600-100 cm^{-1} .

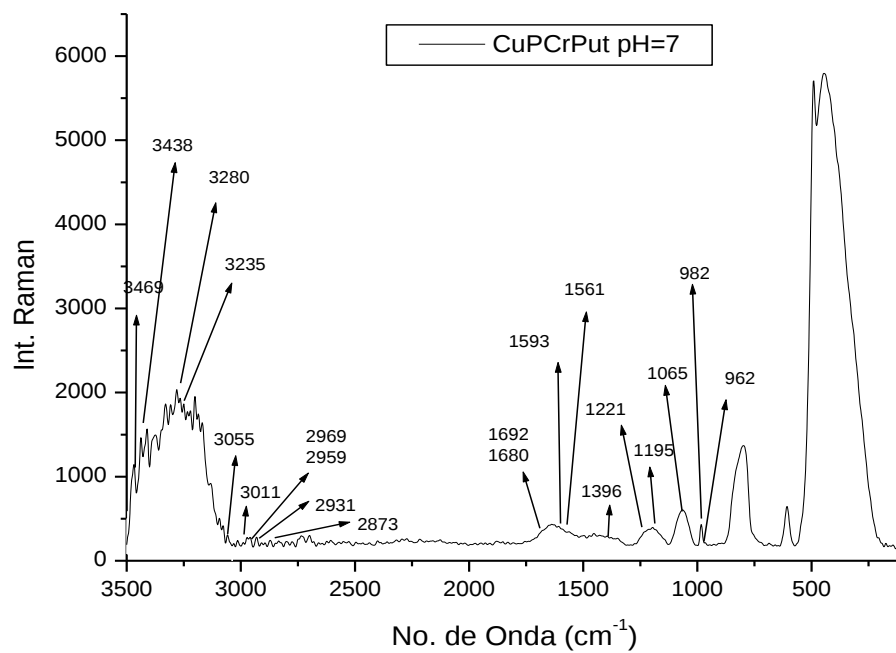


Figura A.3.3.g – Espectro Raman para o sistema Cu:PCr:Put pH=7, na proporção 1:1:1.

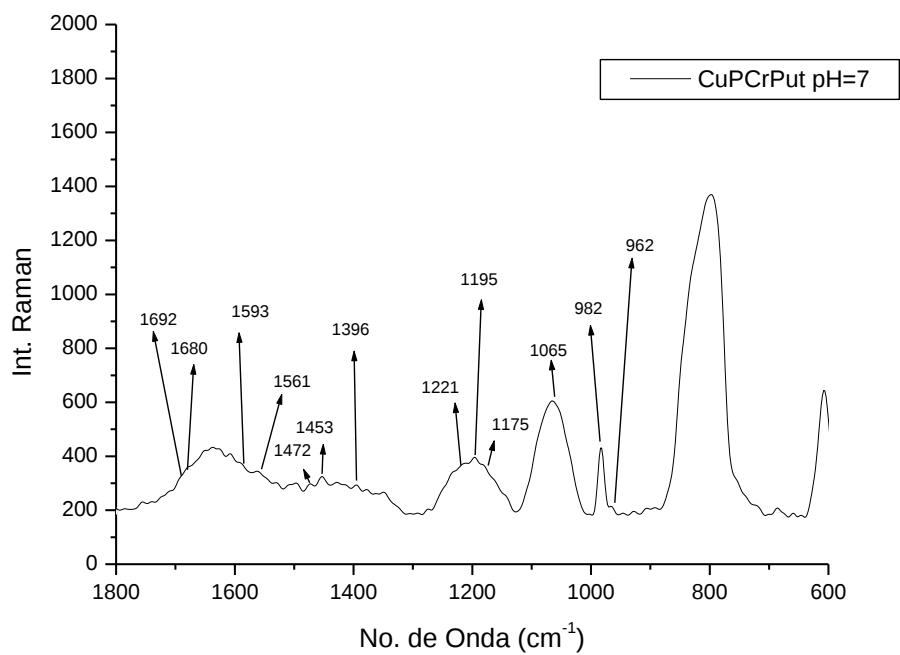


Figura A.3.3.h – Espectro Raman para o sistema Cu:PCr:Put pH=7, na proporção 1:1:1, escala 1800-600 cm^{-1} .

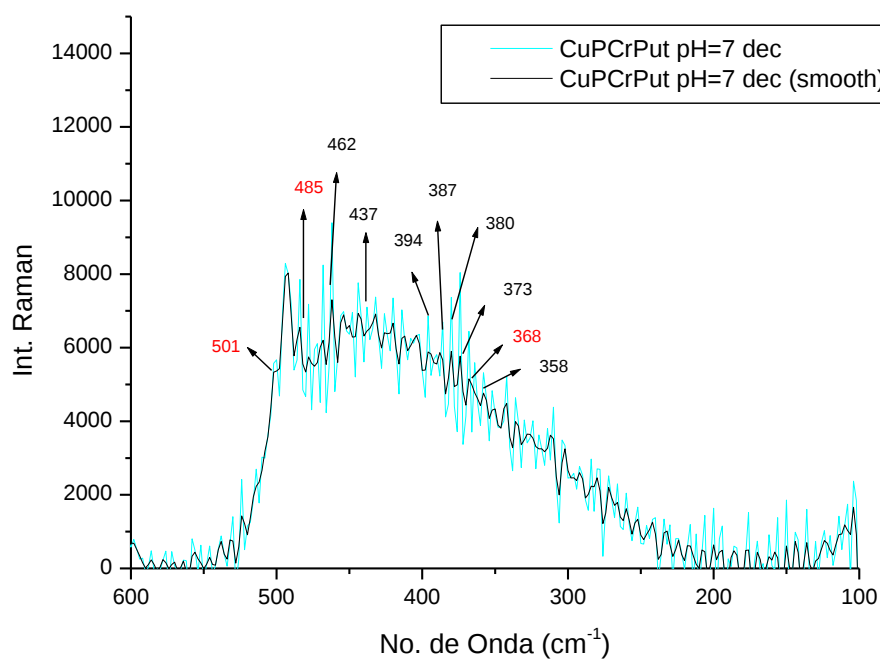


Figura A.3.3.i – Espectro Raman para o sistema Cu:PCr:Put pH=7, na proporção 1:1:1, escala 600-100 cm^{-1} .

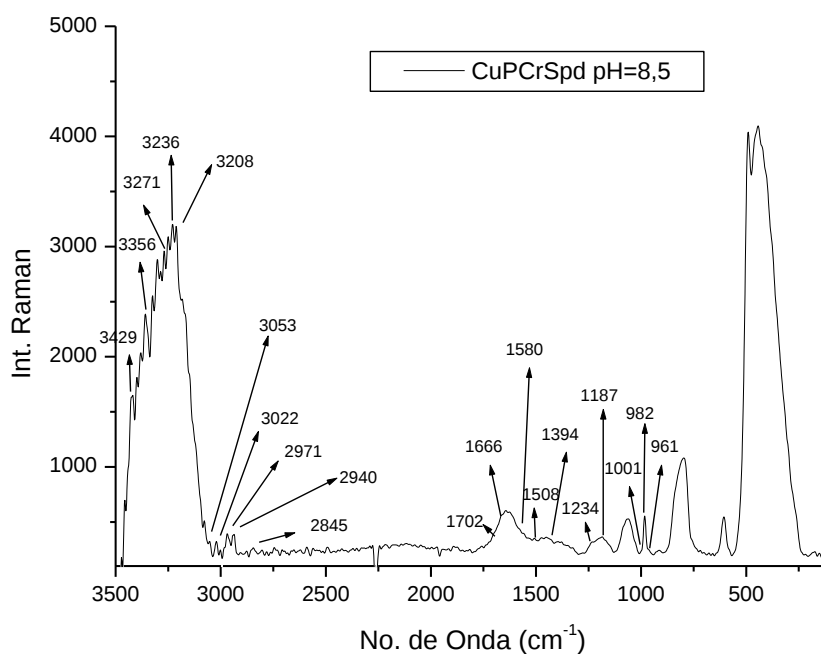


Figura A.3.3.j – Espectro Raman para o sistema Cu:PCr:Spd pH=8,5, na proporção 1:1:1.

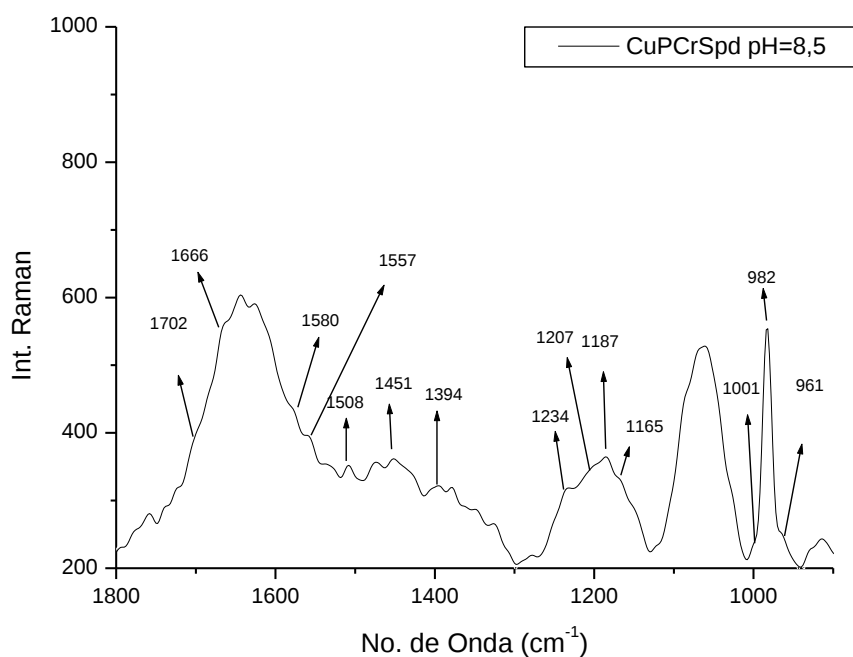


Figura A.3.3.l – Espectro Raman para o sistema Cu:PCr:Spd pH=8,5, na proporção 1:1:1, escala 1800-600 cm^{-1} .

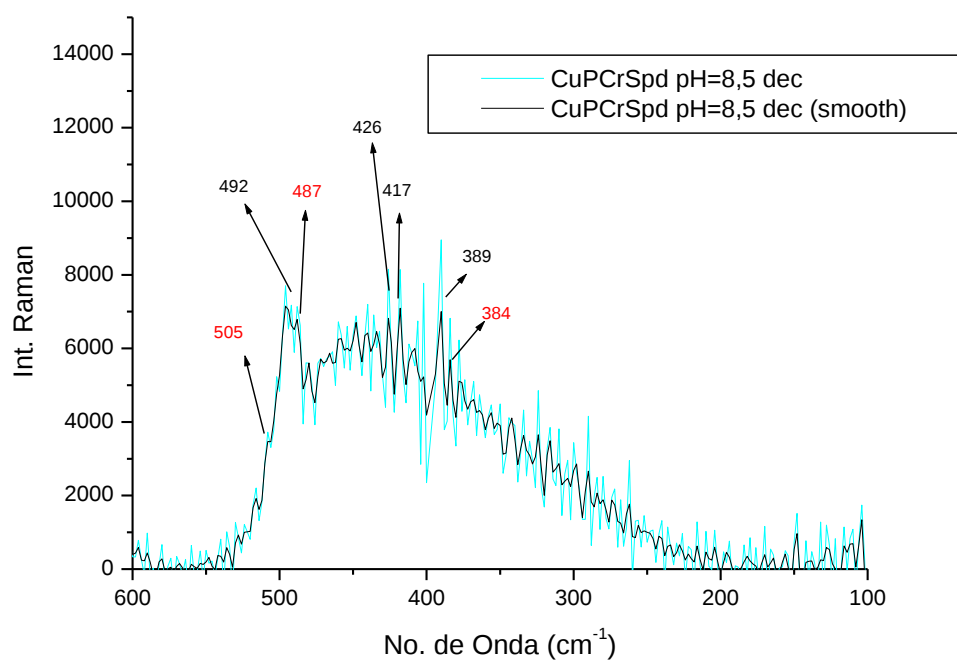


Figura A.3.3.m – Espectro Raman para o sistema Cu:PCr:Spd pH=8,5, na proporção 1:1:1, escala 600-100 cm^{-1} .

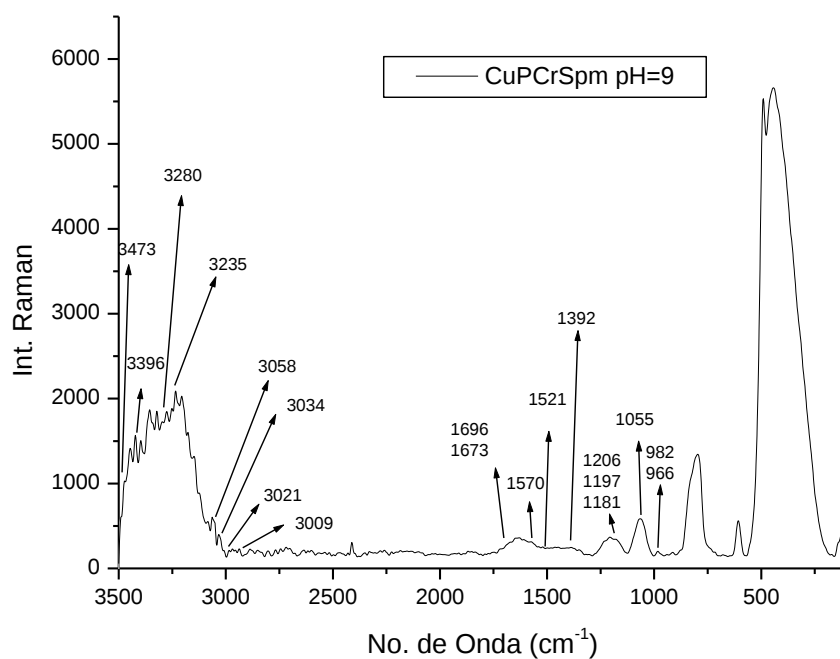


Figura A.3.3.n– Espectro Raman para o sistema Cu:PCr:Spm pH=9, na proporção 1:1:1.

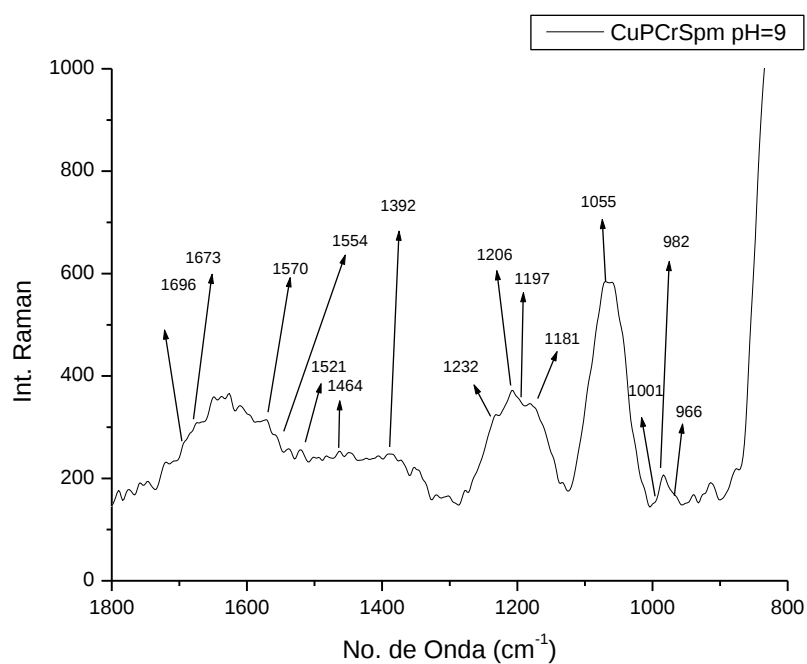


Figura A.3.3.o – Espectro Raman para o sistema Cu:PCr:Spm pH=9, na proporção 1:1:1, escala 1800- 600 cm^{-1} .

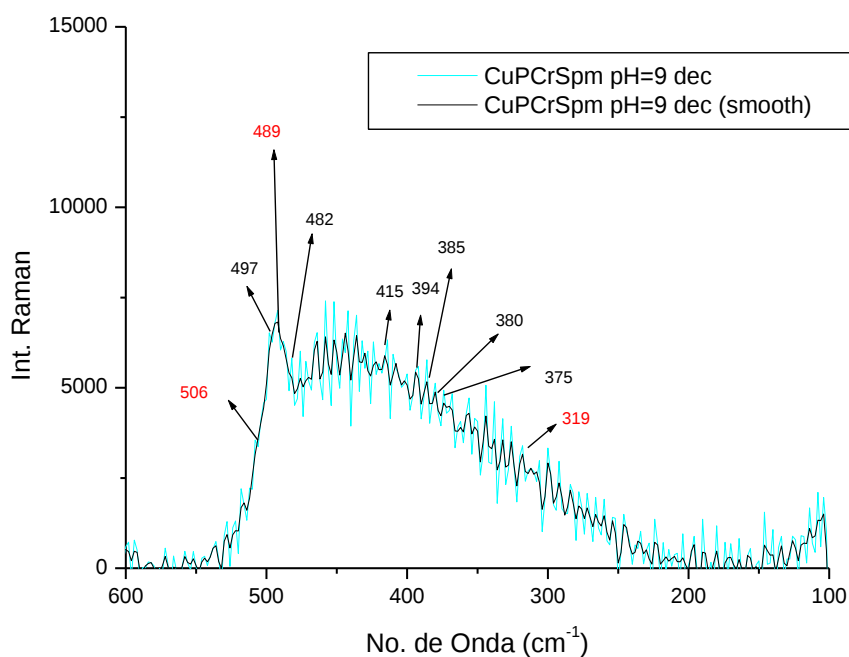


Figura A.3.3.p – Espectro Raman para o sistema Cu:PCr:Spm pH=9, na proporção 1:1:1, escala 600-100 cm^{-1} .

A.3.4

Espectros do Raman para os sistemas ternários Zn:PCr:PA (PA=en, tn, Put, Spd e Spm)

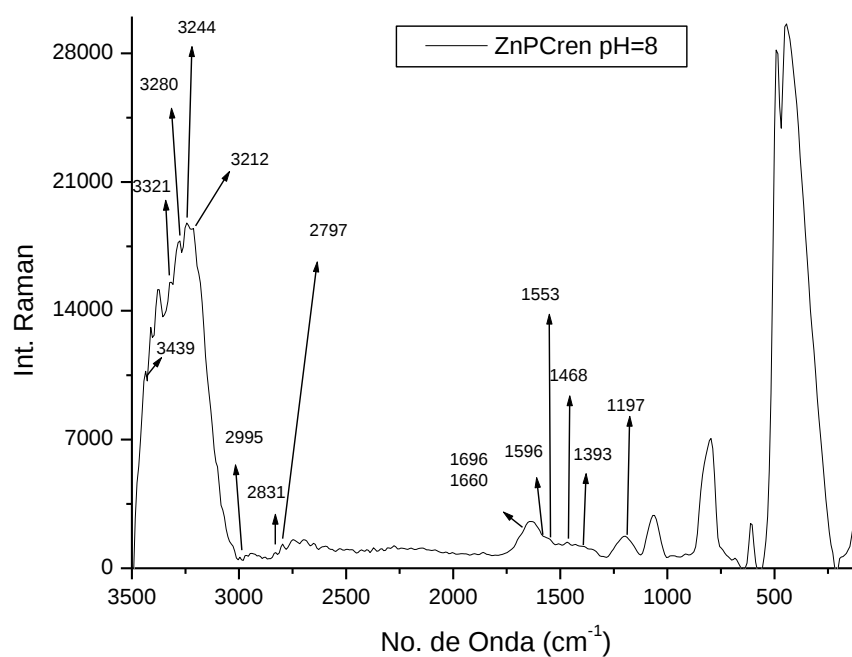


Figura A.3.4.a – Espectro Raman para o sistema Zn:PCr:en pH=8, na proporção 1:1:1.

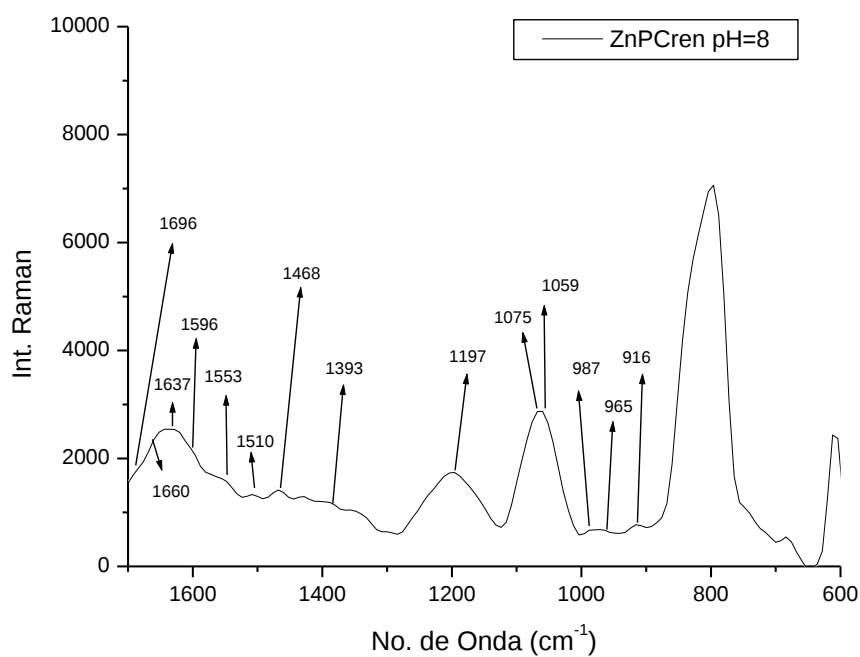


Figura A.3.4.b – Espectro Raman para o sistema Zn:PCr:en pH=8, na proporção 1:1:1, escala 1800-600 cm^{-1} .

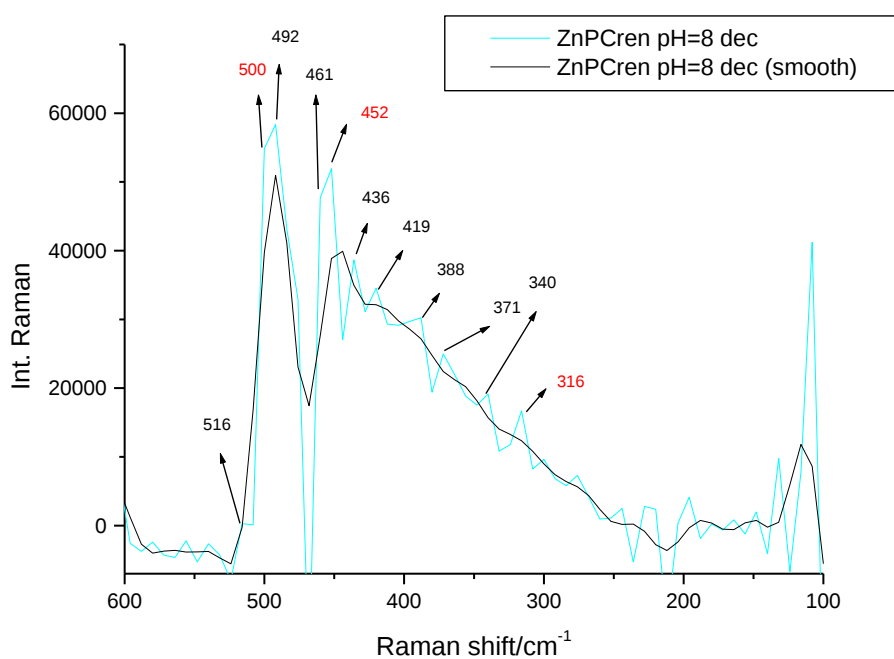


Figura A.3.4.c – Espectro Raman para o sistema Zn:PCr:en pH=8, na proporção 1:1:1, escala 600-100 cm^{-1} .

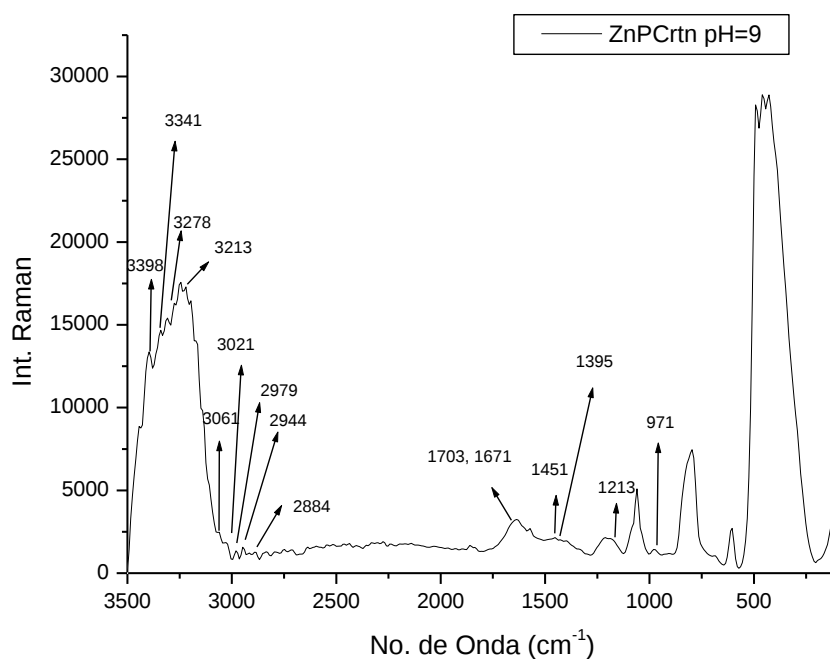


Figura A.3.4.d – Espectro Raman para o sistema Zn:PCr:tn pH=9, na proporção 1:1:1.

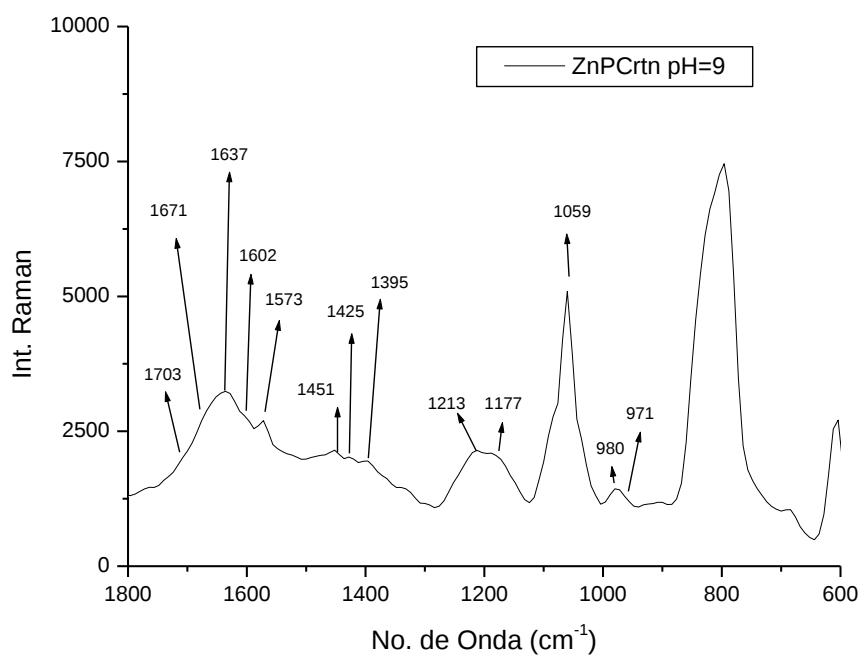


Figura A.3.4.e – Espectro Raman para o sistema Zn:PCr:tn pH=9, na proporção 1:1:1, escala 1800-600 cm⁻¹.

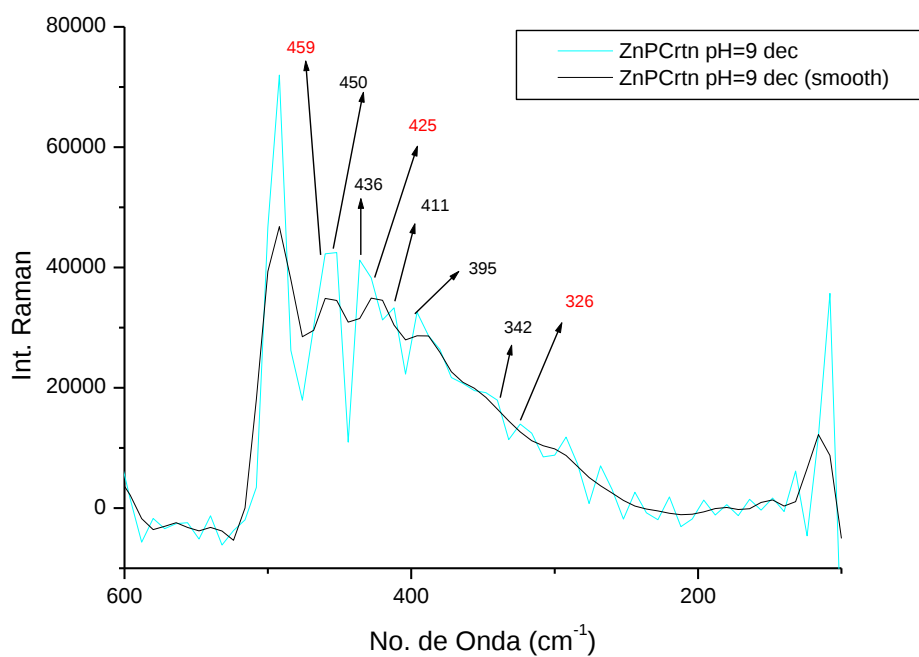


Figura A.3.4.f – Espectro Raman para o sistema Zn:PCr:tn pH=9, na proporção 1:1:1, escala 600-100 cm^{-1} .

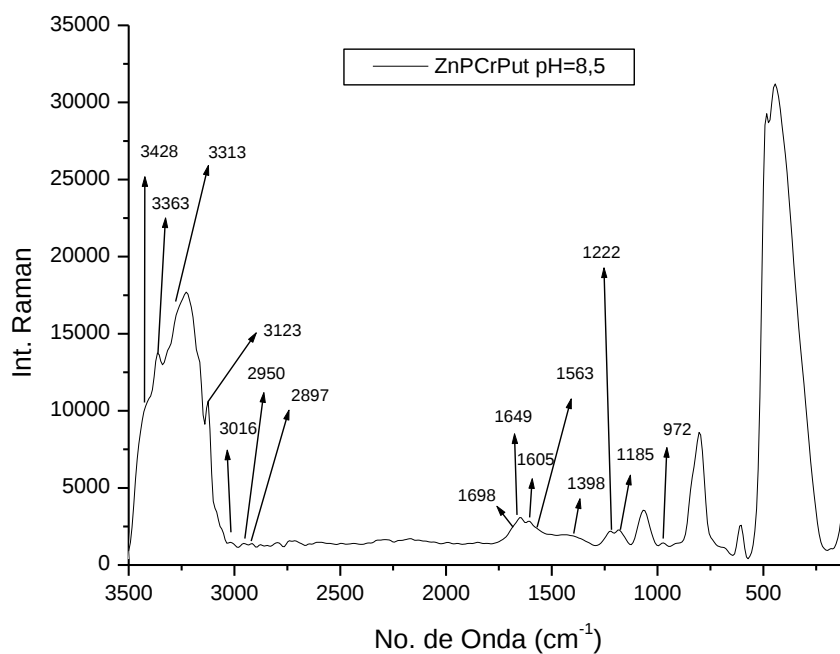


Figura A.3.4.g – Espectro Raman para o sistema Zn:PCr:Put pH=8,5, na proporção 1:1:1.

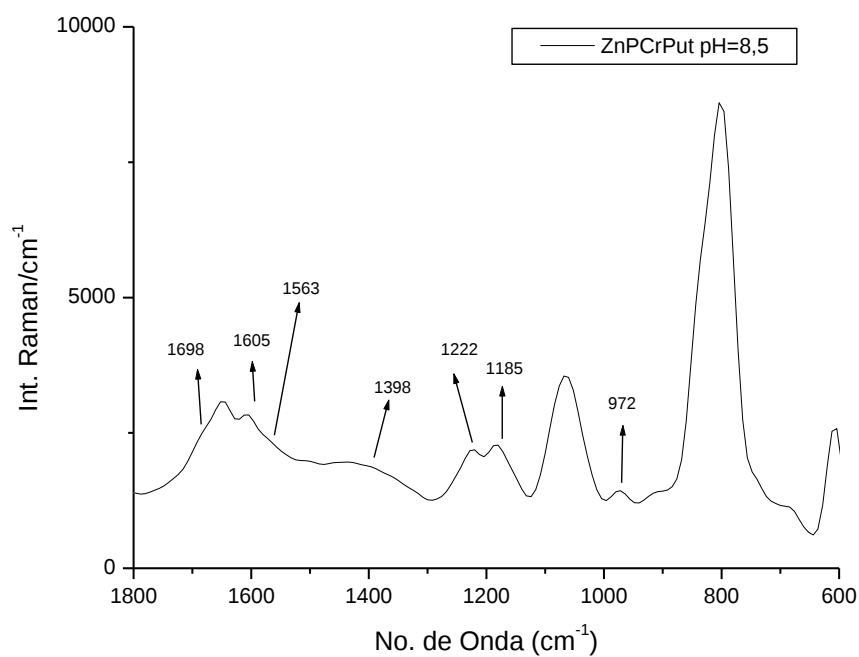


Figura A.3.4.h – Espectro Raman para o sistema Zn:PCr:Put pH=8,5, na proporção 1:1:1, escala 1800-600 cm^{-1} .

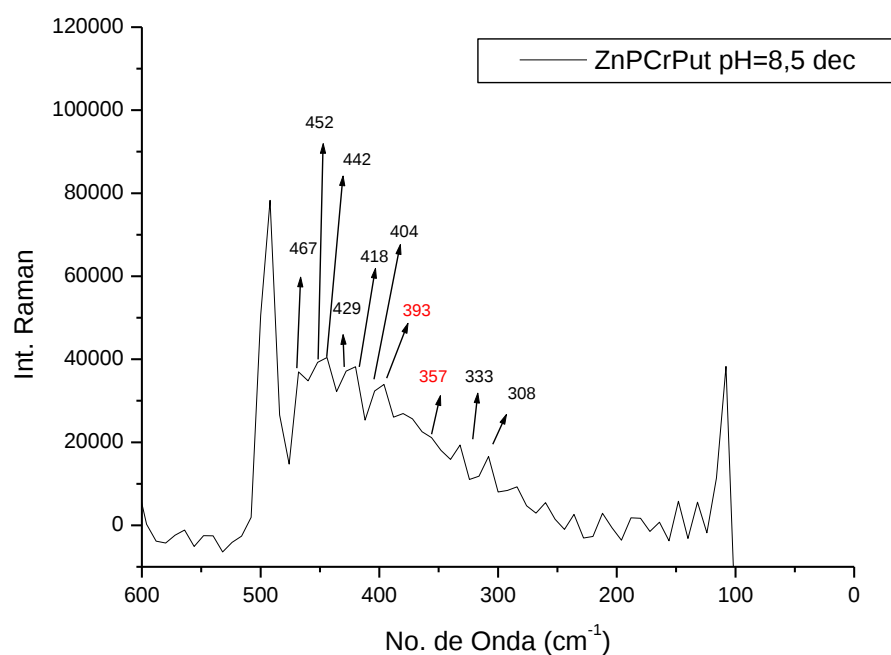


Figura A.3.4.i – Espectro Raman para o sistema Zn:PCr:Put pH=8,5, na proporção 1:1:1, escala 600-100 cm^{-1} .

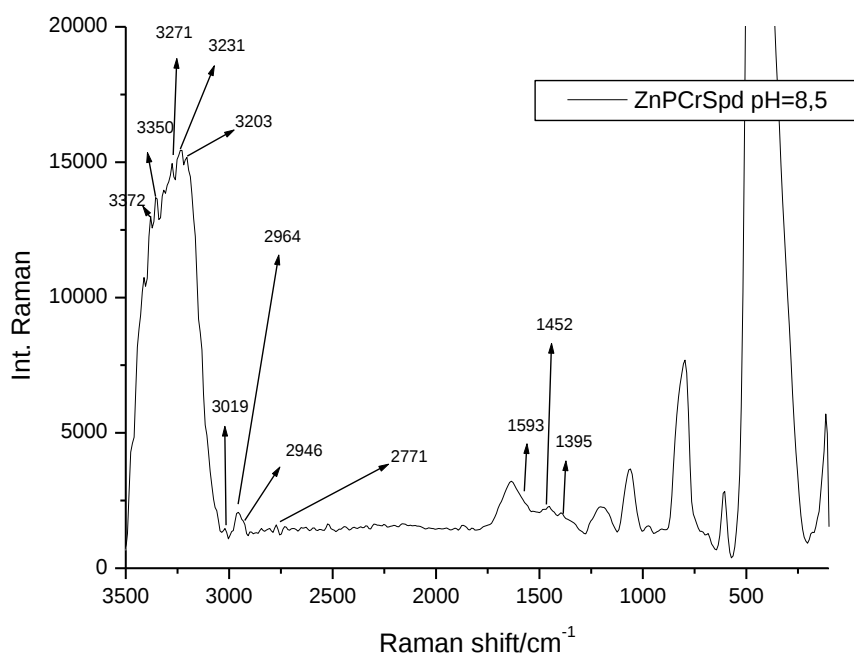


Figura A.3.4.j – Espectro Raman para o sistema Zn:PCr:Spd pH=8,5, na proporção 1:1:1.

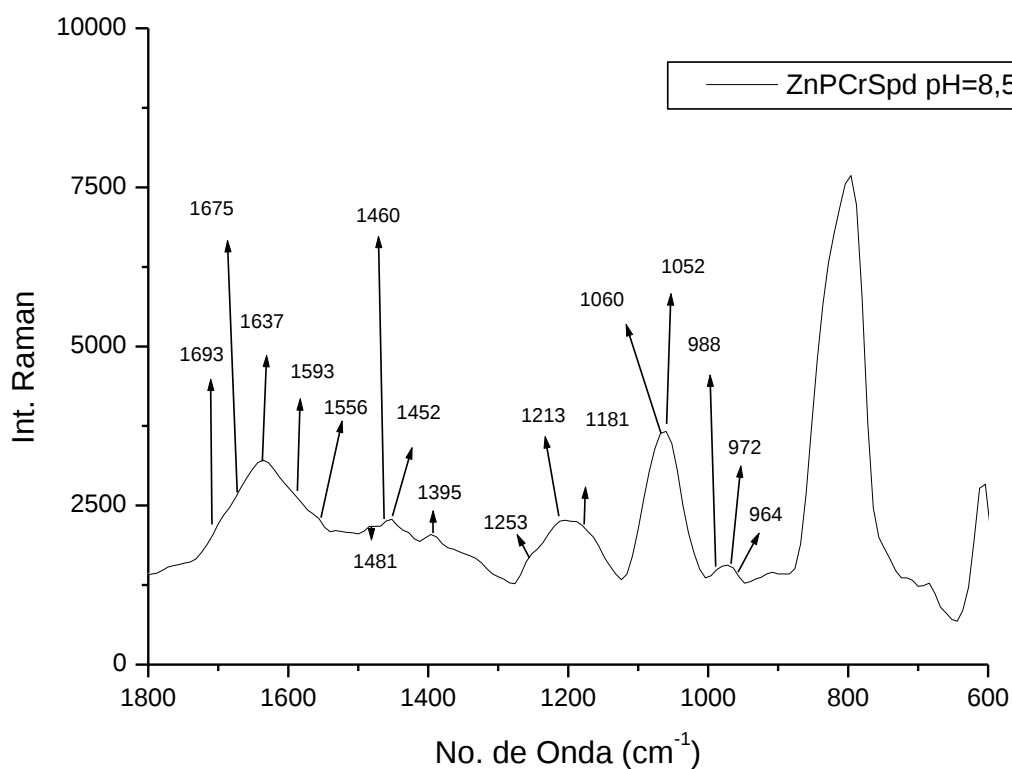


Figura A.3.4.l – Espectro Raman para o sistema Zn:PCr:Spd pH=8,5, na proporção 1:1:1, escala 1800-600 cm^{-1} .

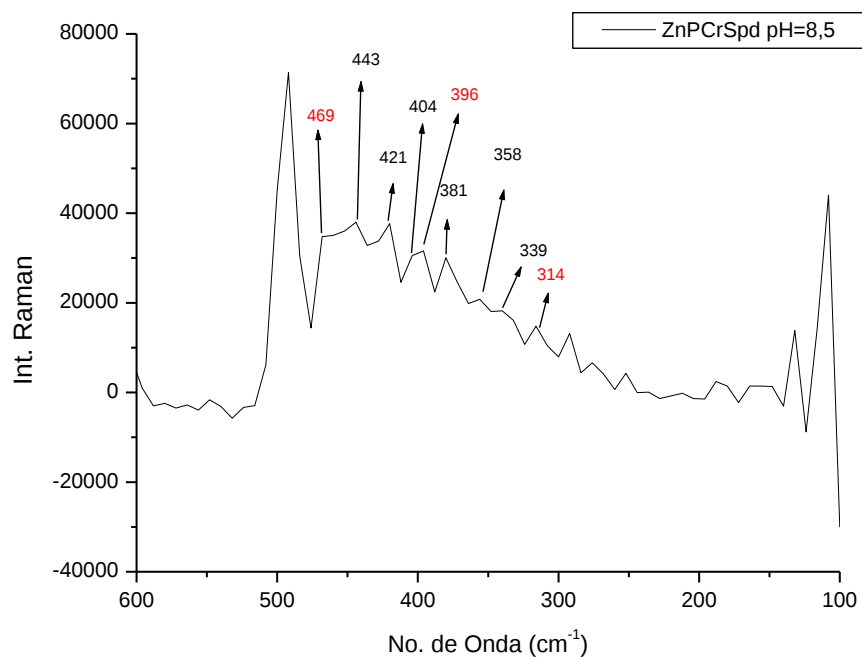


Figura A.3.4.m – Espectro Raman para o sistema Zn:PCr:Spd pH=8,5, na proporção 1:1:1, escala 600-100 cm^{-1} .

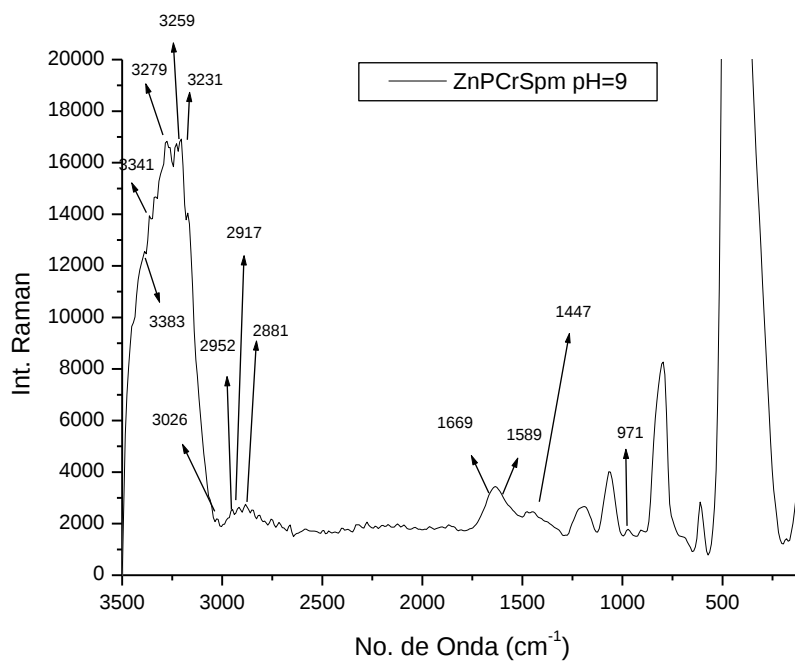


Figura A.3.4.n – Espectro Raman para o sistema Zn:PCr:Spm pH=9, na proporção 1:1:1.

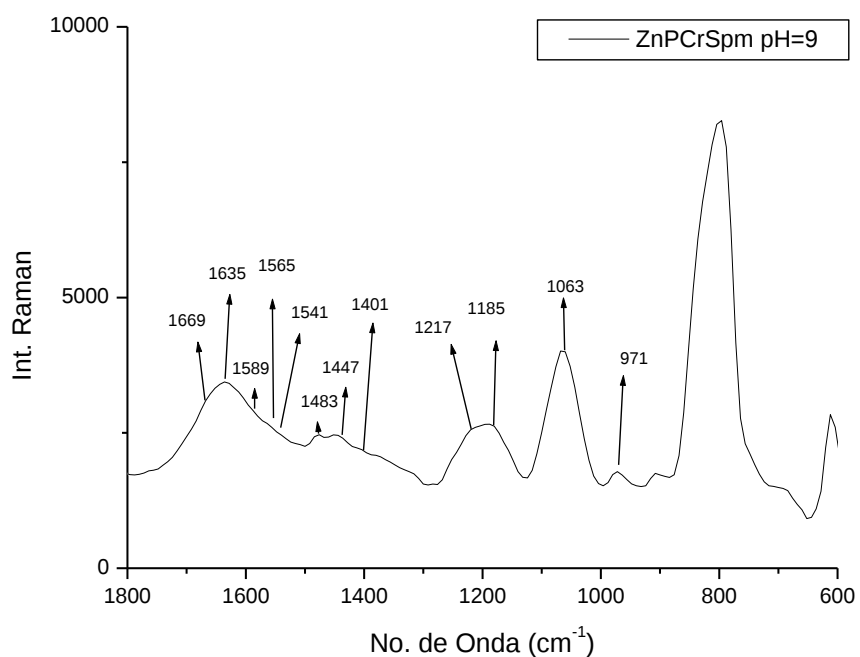


Figura A.3.4.o – Espectro Raman para o sistema Zn:PCr:Spm pH=9, na proporção 1:1:1, escala 1800-600 cm⁻¹.

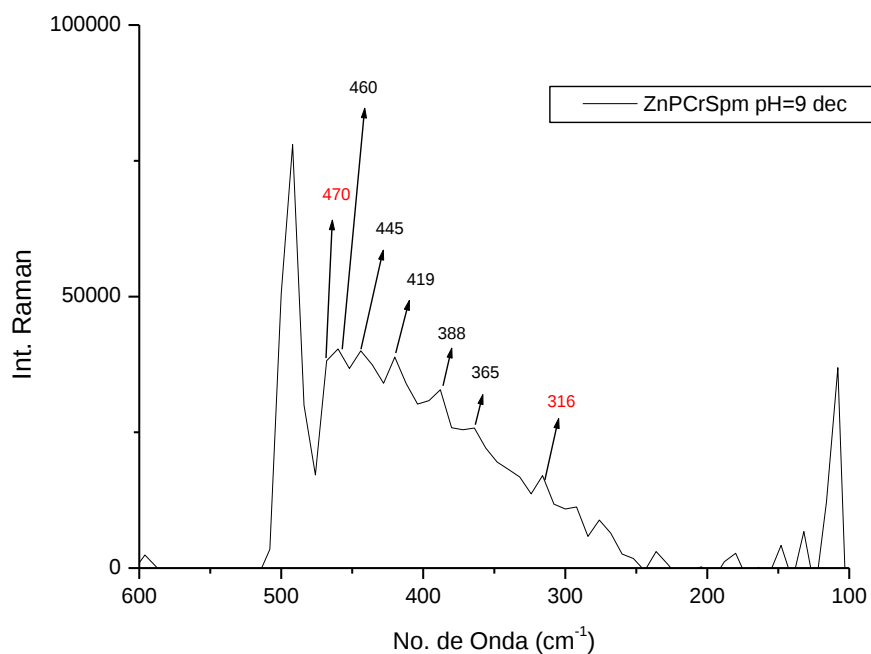


Figura A.3.4.p – Espectro Raman para o sistema Zn:PCr:Spm pH=9, na proporção 1:1:1, escala 600-100 cm⁻¹.

A.3.5

Espectros do Raman para os sistemas ternários Zn:ATP:PA (PA=en, tn, Put, Spd e Spm)

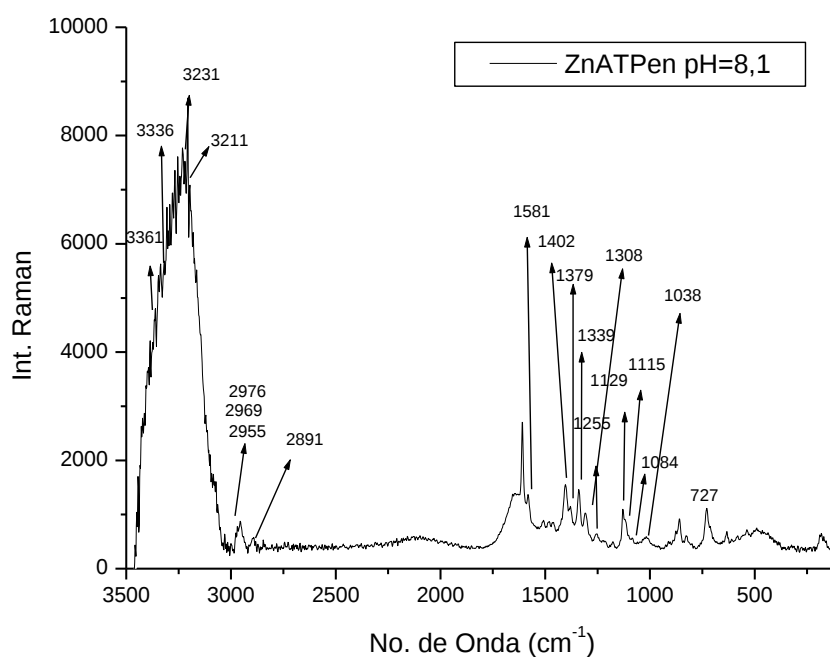


Figura A.3.5.a – Espectro Raman para o sistema Zn:ATP:en pH=8,1, na proporção 1:1:1.

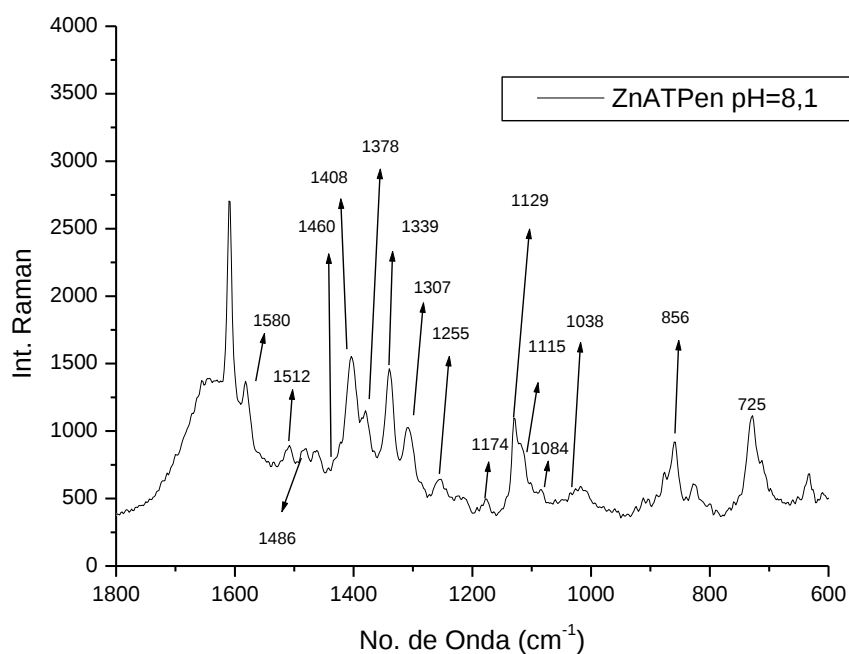


Figura A.3.5.b – Espectro Raman para o sistema Zn:ATP:en pH=8,1, na proporção 1:1:1, escala 1800-600 cm^{-1} .

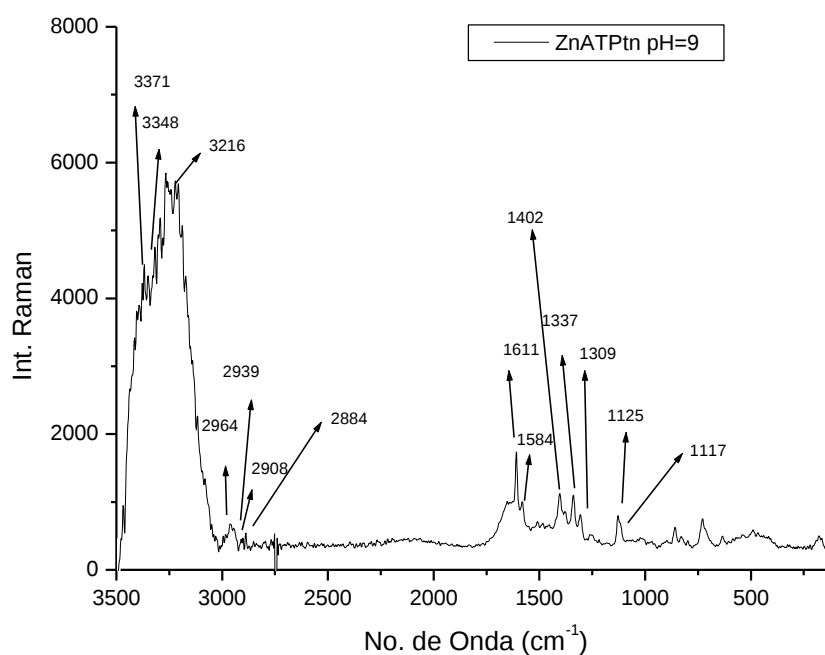


Figura A.3.5.c – Espectro Raman para o sistema Zn:ATP:tn pH=9, na proporção 1:1:1.

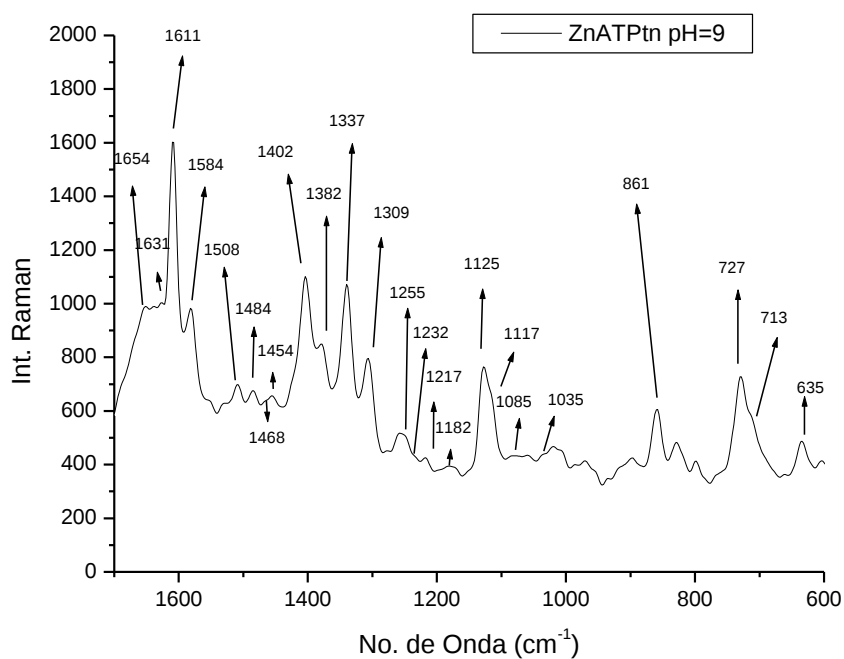


Figura A.3.5.d – Espectro Raman para o sistema Zn:ATP:tn pH=9, escala 1700-600 cm⁻¹, na proporção 1:1:1.

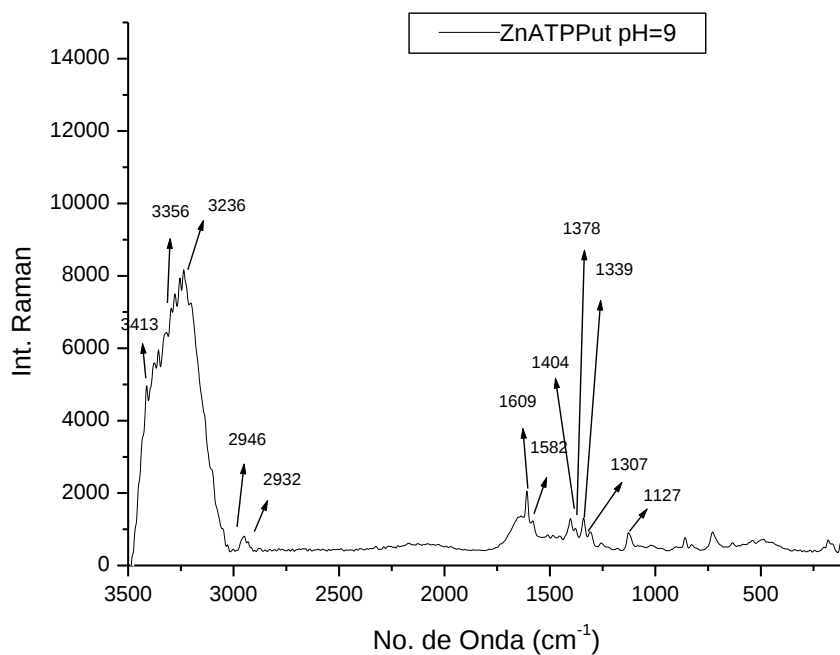


Figura A.3.5.e – Espectro Raman para o sistema Zn:ATP:Put pH=8,5, na proporção 1:1:1.

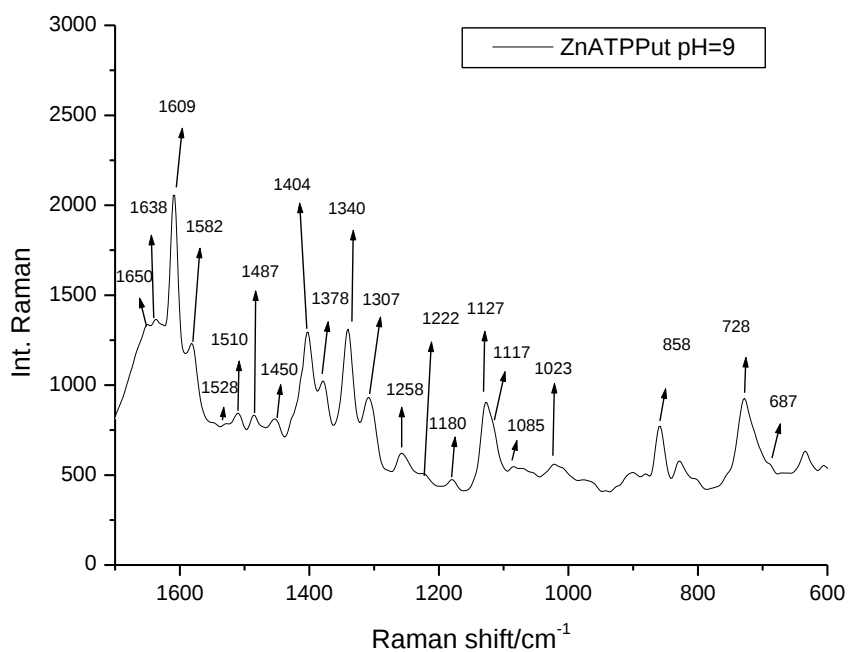


Figura A.3.5.f – Espectro Raman para o sistema Zn:ATP:Put pH=8,5, escala 1700-600 cm⁻¹, na proporção 1:1:1.

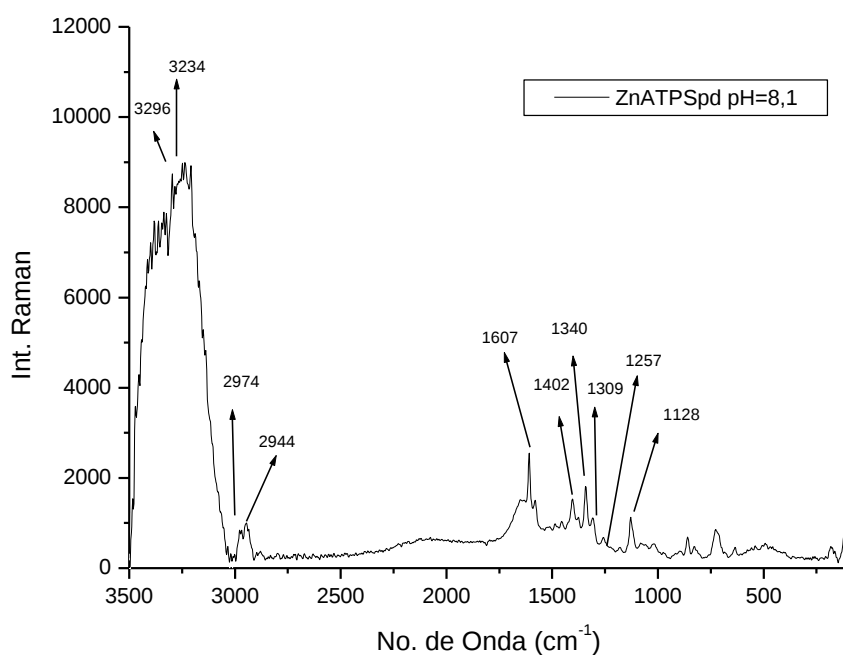


Figura A.3.5.g – Espectro Raman para o sistema Zn:ATP:Spd pH=8,1, na proporção 1:1:1.

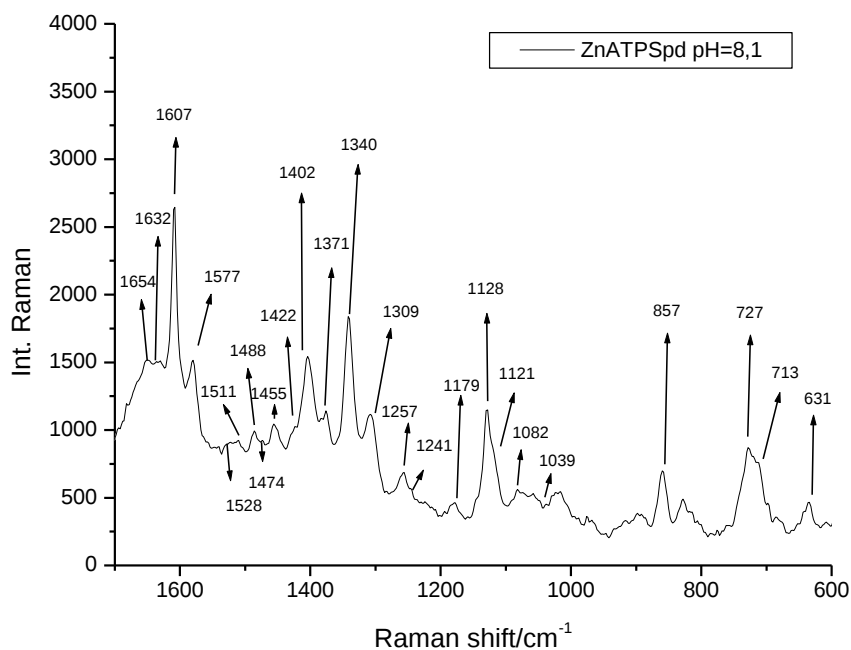


Figura A.3.5.h – Espectro Raman para o sistema Zn:ATP:Spd pH=8,1, na proporção 1:1:1, escala 1700-600 cm⁻¹.

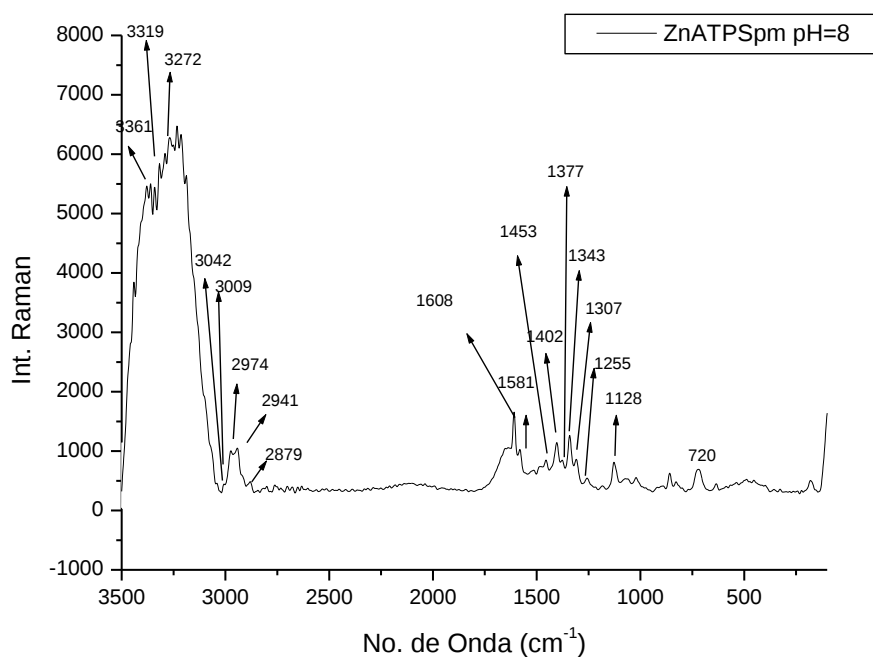


Figura A.3.5.i – Espectro Raman para o sistema Zn:ATP:Spm pH=8, na proporção 1:1:1.

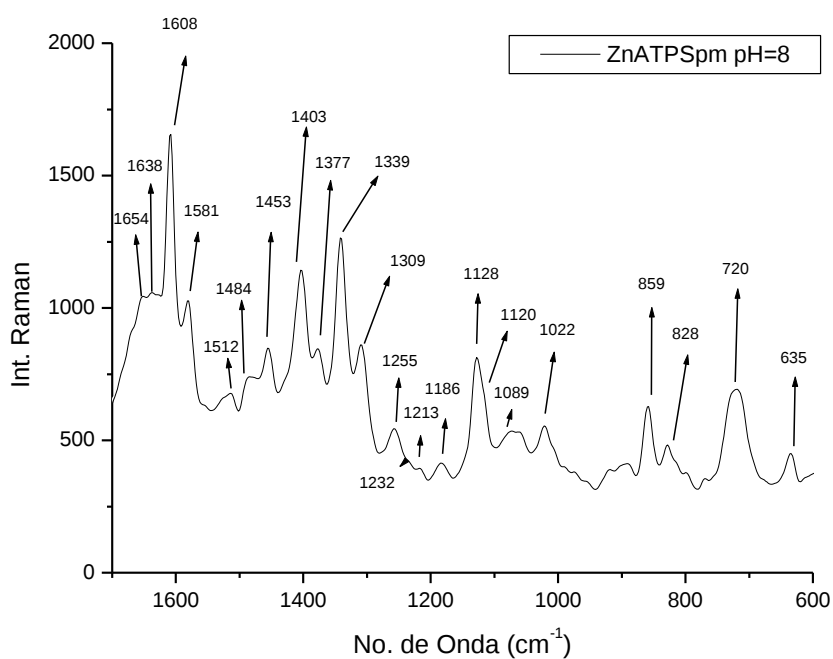


Figura A.3.5.j – Espectro Raman para o sistema Zn:ATP:Spm pH=8, na proporção 1:1:1, escala 1700-600 cm^{-1} .

A.4 RMN ^1H

A.4.1 Espectros do RMN ^1H para os ligantes puros

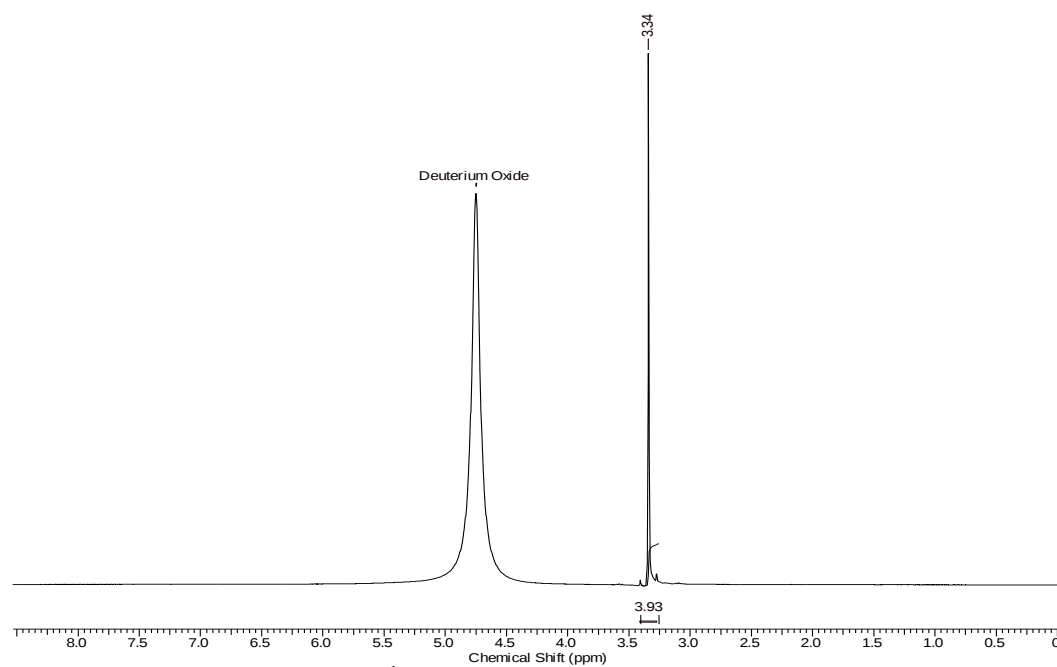


Figura A.4.1.a – Espectro RMN ^1H para o ligante em

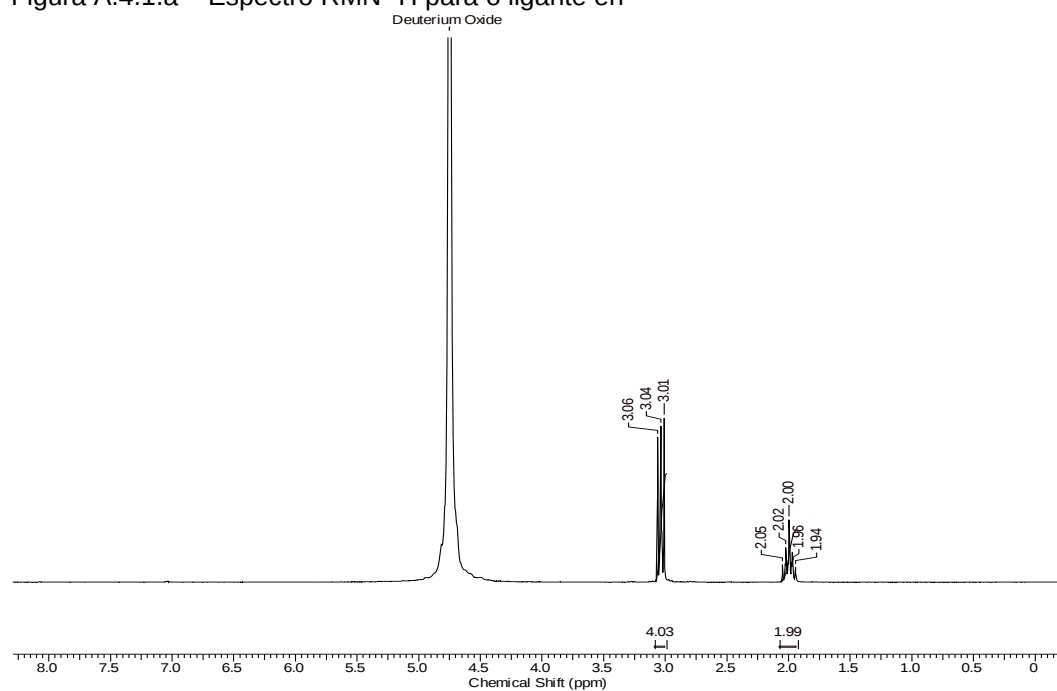


Figura A.4.1.b – Espectro RMN ^1H para o ligante tn

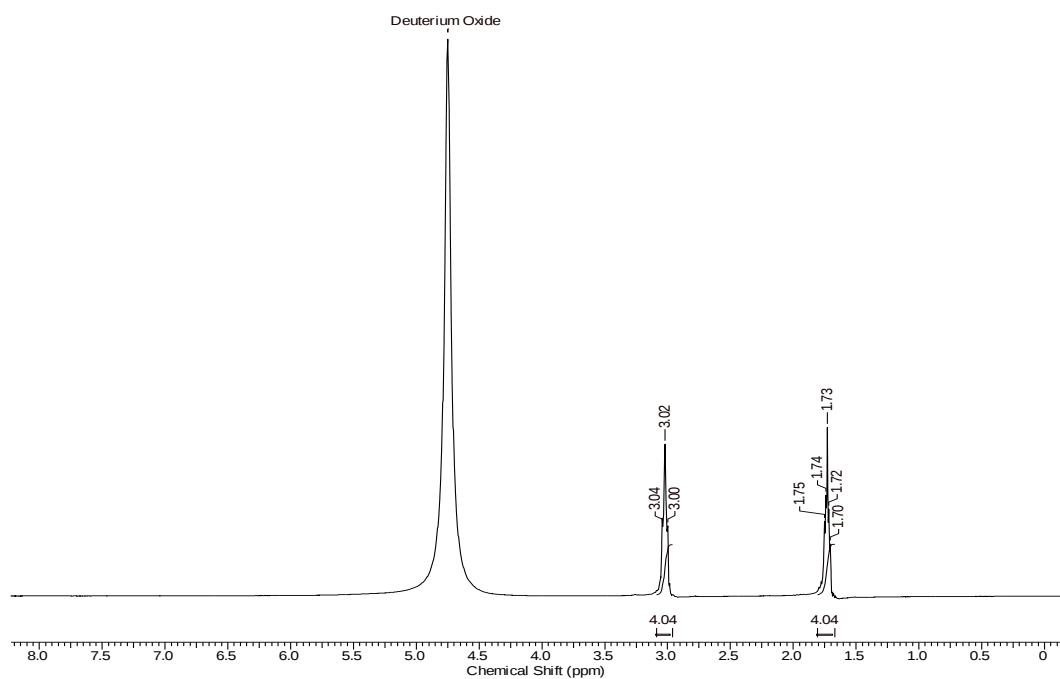


Figura A.4.1.c – Espectro RMN ^1H para o ligante Put

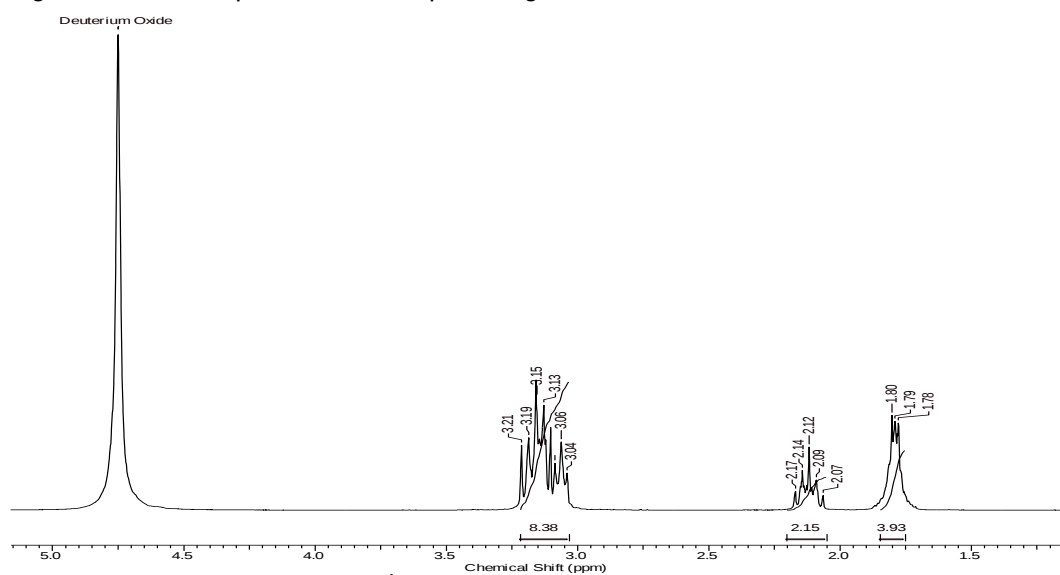


Figura A.4.1.d – Espectro RMN ^1H para o ligante Spd

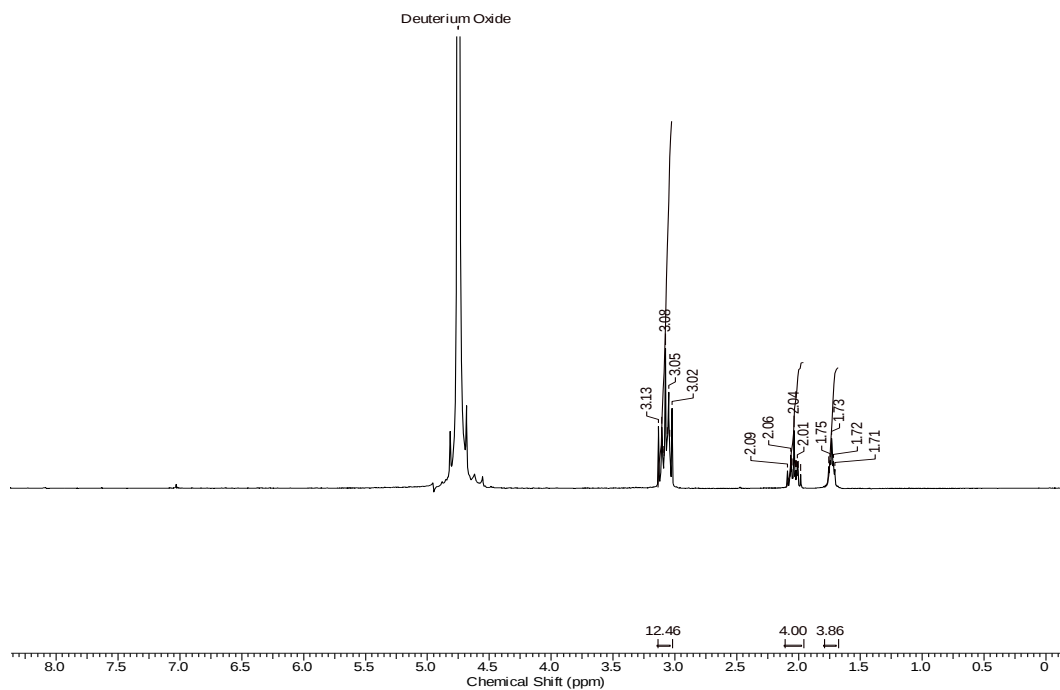


Figura A.4.1.e – Espectro RMN ^1H para o ligante Spm

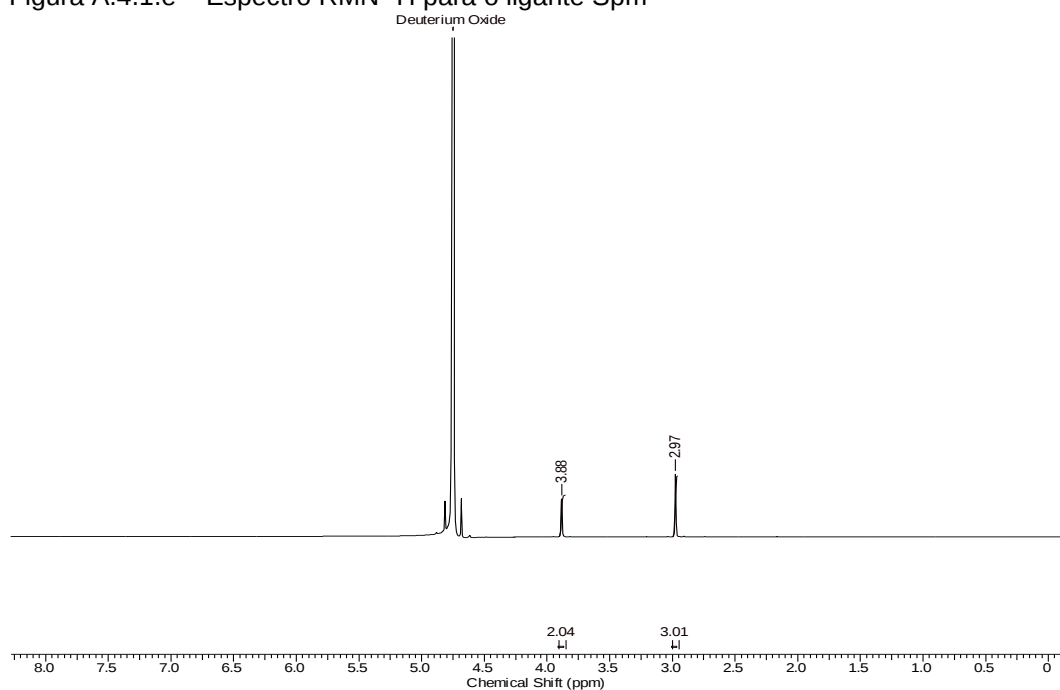


Figura A.4.1.f – Espectro RMN ^1H para o ligante PCr

A.4.2

Espectros do RMN ^1H para os sistemas binários Zn:Put e Zn:PCr

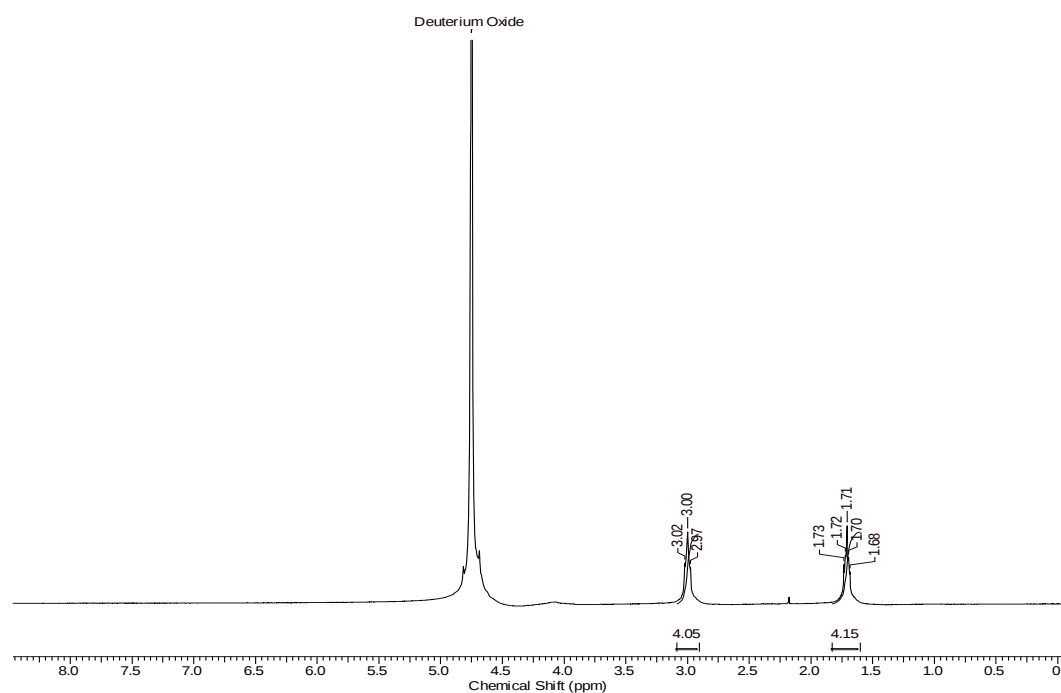


Figura A.4.2.a – Espectro RMN ^1H para o sistema Zn:Put pH=7, na proporção 1:1.

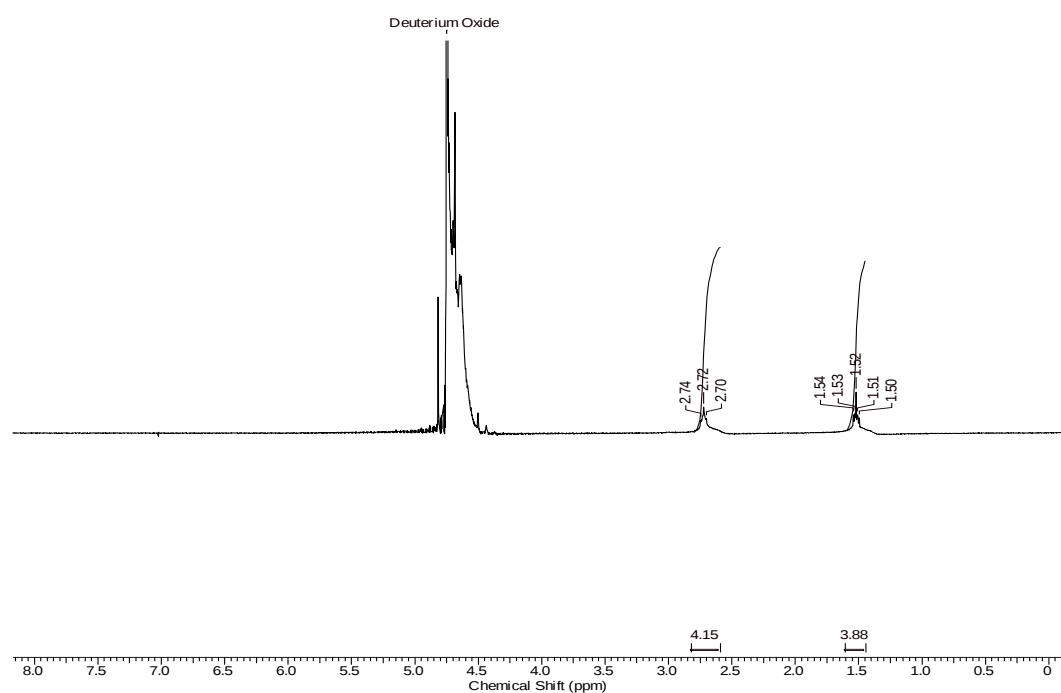


Figura A.4.2.b – Espectro RMN ^1H para o sistema Zn:Put pH=11, na proporção 1:1.

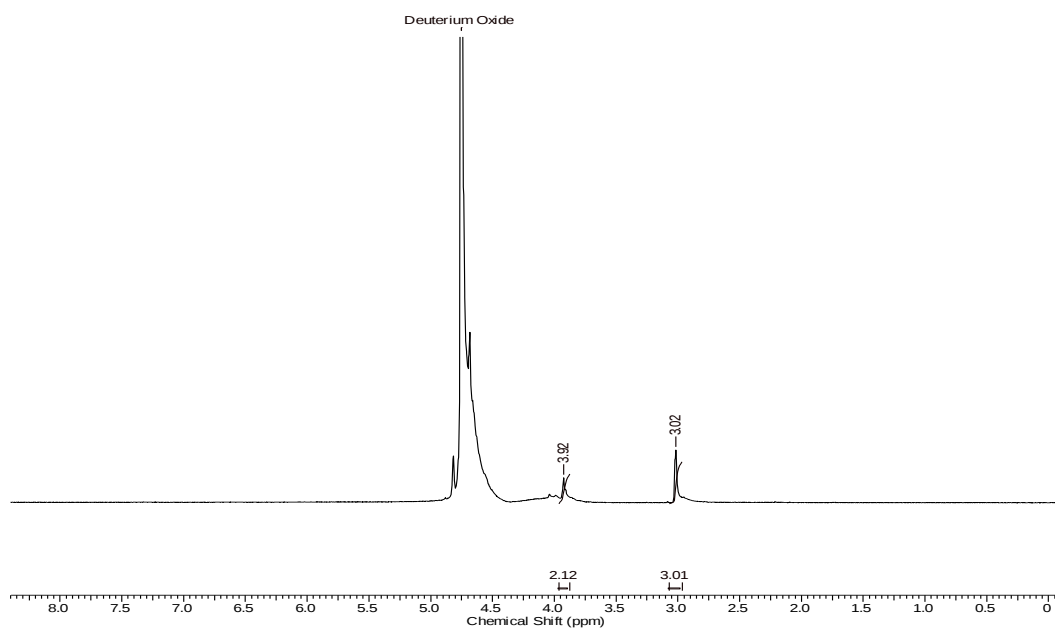


Figura A.4.2.c – Espectro RMN ^1H o sistema Zn:PCr pH=7,1, na proporção 1:1.

A.4.3

Espectros do RMN ^1H para os sistemas ternários Zn:PCr:PA (PA = en, tn, Put, Spd e Spm)

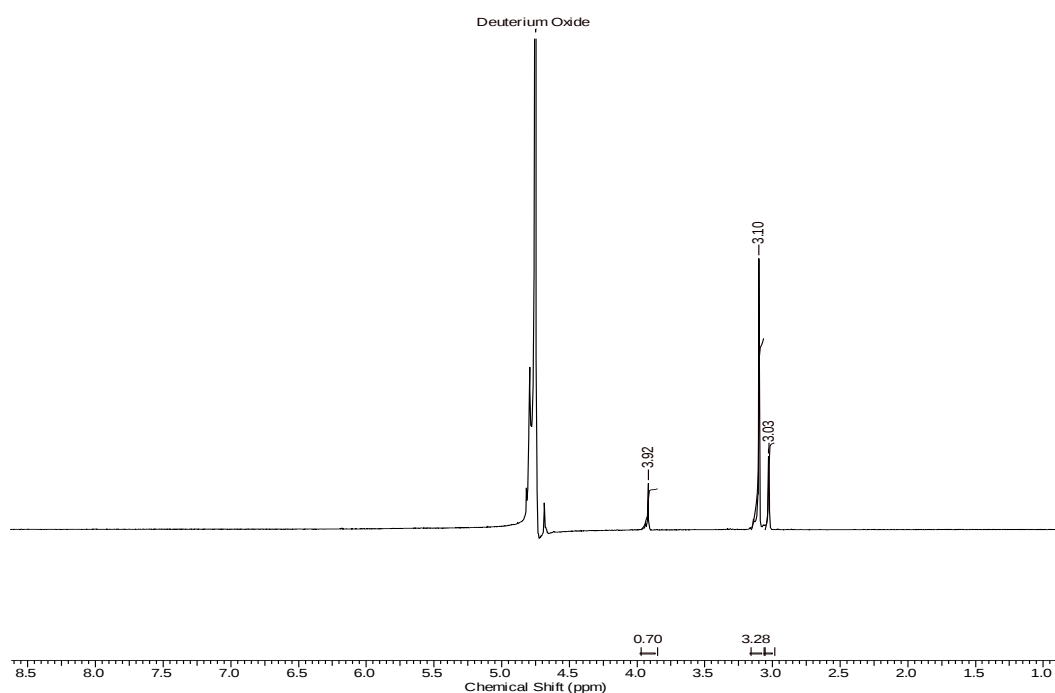


Figura A.4.3.a – Espectro RMN ^1H para o sistema Zn:PCr:en pH=8,1, na proporção 1:1:1.

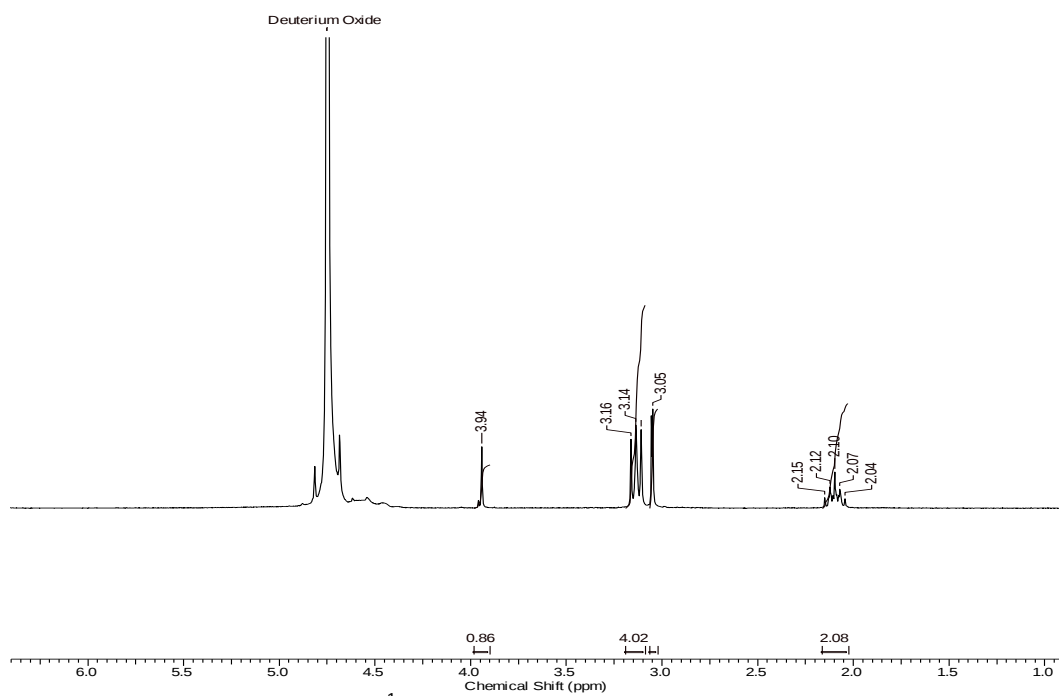


Figura A.4.3.b – Espectro RMN ^1H para o sistema Zn:PCr:tn pH=8,1, na proporção 1:1:1.

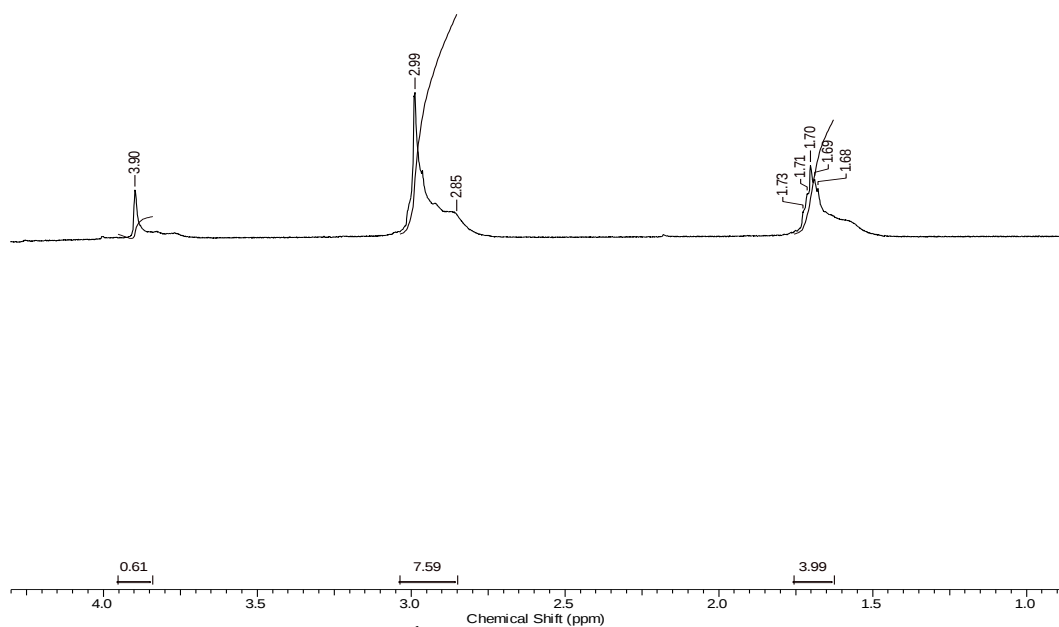


Figura A.4.3.c – Espectro RMN ^1H para o sistema Zn:PCr:Put pH=8,7, na proporção 1:1:1.

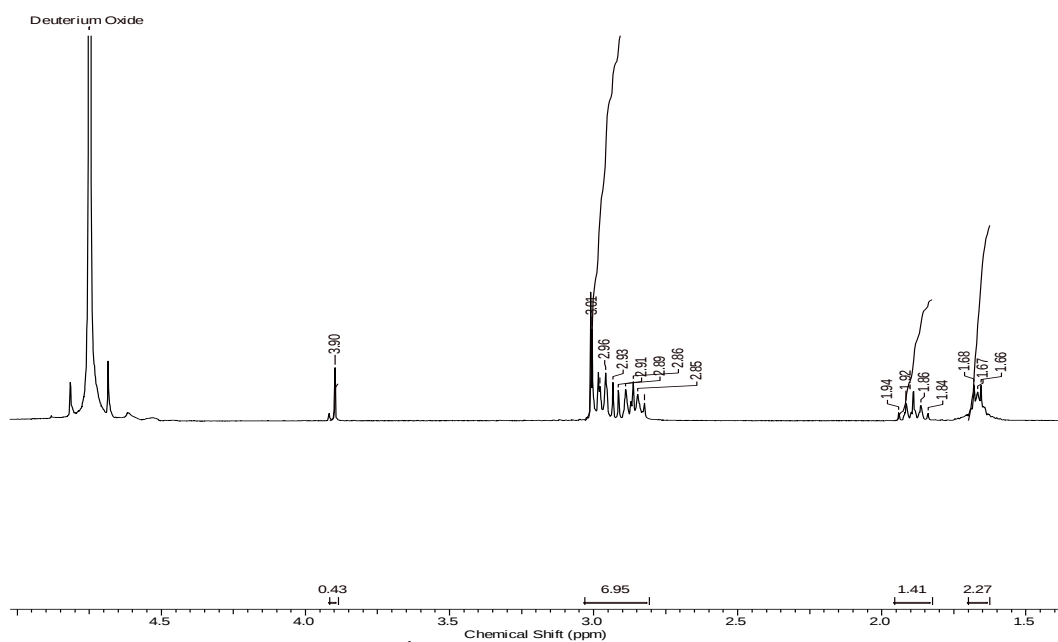


Figura A.4.3.d – Espectro RMN ^1H para o sistema Zn:PCr:Spd pH=9,5, na proporção 1:1:1.

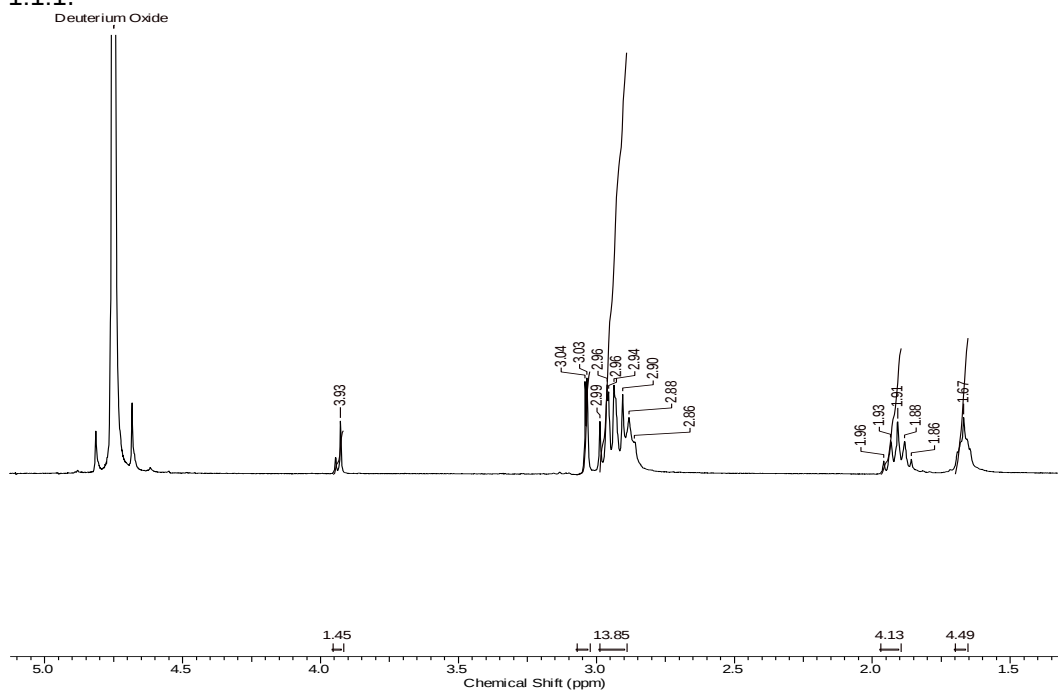


Figura A.4.3.e – Espectro RMN ^1H para o sistema Zn:PCr:Spm pH=9,8, na proporção 1:1:1.