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9
Apêndice

9.1.Macros desenvolvidas:

Para análise de inclusões utilizando as técnicas de MO e MEV e para análise e quantificação de fases.

- **Análise de inclusões por MO**

```
imgdelete "*.*"
Gclear 0
showwindow "Messages", 1
write "@"
diretorio = "A1wustita100opt"
imgsetpath "z:/Fredy/" + diretorio
read diretorio , 'entre com o nome do diretorio"
nome = "z:/Fredy/" + diretorio + "/BD"
DBsetpath nome
MSsetprop "CONDITION", 1
MSsetprop "CONNECT",4 # determinando forma de conexão
MSsetprop "SCALEX",0.1057
MSsetprop "SCALEY",0.1057
MSsetprop "UNIT","µm"
MSsetprop "CONDITION", 1
MSsetprop "DRAWFEAT","DRCONTOURU"
MSsetprop "REGIONFEAT","FERETRATIO,DCIRCLE,AREA"
MSsetprop "REGIONFEAT",",,FCP = 4*PI*AREAF/SQR(PERIM)"
MSsetprop "REGIONFEAT",",,FCF= 4*AREAF/(PI*SQR(FERETMAX))"
MSsetprop"FIELDFEAT","FLDAREAP[%]=SUM(100*AREA/FRAMEA
REA),FLDCOUNT[#]=SUM(1)"
if(DBexist("inclusoesreg")) : DBdelete "inclusoesreg"
if(DBexist("inclusoesfield")) : DBdelete "inclusoesfield"
```

```
image = "z:/Fredy/" + diretorio + "/*.tif"
while 1
 imgenum image,1
 if (not _STATUS): break
 imgdelete "*.*"
 Gclear 0
 # CARREGANDO A IMAGEM
 imgload image,1
 write image
#-------------------------------------------------------------------------------
#ETAPA 1 - Pré-Processamento
#-------------------------------------------------------------------------------
#ETAPA 2 - Segmentação
#-------------------------------------------------------------------------------
 disdyn 1,2,15,10,1
 binnot 2,2
 binfill 2,3
#-------------------------------------------------------------------------------
#ETAPA 3 - Pós-Processamento 1
#-------------------------------------------------------------------------------
 grainsbin 3,4,2,3,1,12
 binscrap 4,5,0,10,0
 binborderkill 5,6 #eliminando partículas que tocam as bordas""
 Fmin := 0.35
 cond2 = " 4*AREA/(SQR(FERETMAX)*PI) > " + string(Fmin)
 MSsetprop "CONDITION",cond2
 imgdelete 7
 MSlabelmask 6,1,7,1,255
 Gclear 0
 MSdrawmask 7,1
 binxor 6,7,8
 Gextract 8,128,255,11
 imgdisplay 1
 pause
```

```
#-------------------------------------------------------------------------------
#ETAPA 4 - Obtenha os parâmetros de região - REGION FEATURES
#-------------------------------------------------------------------------------
MSmeasmask 7,1,"inclusoesreg",1,0,10
#-------------------------------------------------------------------------------
#ETAPA 5 - Obtenha os parâmetros de campo - FIELD FEATURES
#-------------------------------------------------------------------------------
MSmeasmask 7,1,"INCLUSOESFIELD",1,2,10
endwhile
datalist "inclusoesFIELD",0,0
```

- **Análise de inclusões por MEV**

```
Gclear 0
imgdelete "*.*"
showwindow "Messages", 1
write "@"
diretorio = "A5wustitamev"
imgsetpath "z:/Fredy/" + diretorio
read diretorio , 'entre com o nome do diretorio"
nome = "z:/Fredy/" + diretorio + "/BD"
DBsetpath nome
imgdelete "*.*"
Gclear 0
image = "*.tif"
MSsetprop "SCALEX",0.0207469
MSsetprop "SCALEY",0.0207469
MSsetprop "UNIT", "µm"
MSsetprop "DRAWFEAT", "DRCONTOURU"
MSsetprop "REGIONFEAT","FERETRATIO,DCIRCLE,AREA"
MSsetprop "REGIONFEAT",",,FCP = 4*PI*AREAF/SQR(PERIM)"
MSsetprop "REGIONFEAT",",,FCF= 4*AREAF/(PI*SQR(FERETMAX))"
MSsetprop"FIELDFEAT","FLDAREAP[%]=SUM(100*AREA/FRAMEA
REA),FLDCOUNT[#]=SUM(1)"
MSsetprop "FRAMESTARTX",1
```

```
MSsetprop "FRAMESTARTY",1
MSsetprop "FRAMESIZEX",1022
MSsetprop "FRAMESIZEY",1022
if( DBexist ("database")) : DBdelete "region"
if( DBexist ("field")) : DBdelete "field"
while 1
 imgenum image,1
 if (not _STATUS): break
 imgload image,1
 imgpal2grey 1,1
 write image
 imgnew 2, 1024,1024,1,"Grey"
 wincopy 1,2,0,0,1024,1024,0,0
 sigma 2,3,15,101
 dis = "n"
 while (dis == "n")
 !dislev 3,4,0,81,1
 binscrap 4,5,0,20,0
 binfill 5,6
 Gclear 0
 MSdrawmask 6,1
 imgdisplay 3
 read dis, "Segmentação OK ? (s/n)"
 endwhile
 grainsbin 6,10,2,5,1,12
 Gclear 0
 MSsetprop "CONDITION", 1
 MSdrawmask 10,1
 imgdisplay 2
 resp = "s"
 read resp, "Deseja incluir resultado ?"
 if (resp == "s")
 MSsetprop "FRAMEMODE",1
 MSmeasmask 10,1,"region",1,1,10
```

```
 MSsetprop "FRAMEMODE",0
 MSmeasmask 10,1,"field",1,2,10
 endif
 datalist "FIELD",0,1
 Gclear 0
endwhile
```

- **Macro para medida de fração de micro-constituintes**

```
imgdelete "*.*"
Gclear 0
showwindow "Messages",1
write "@"
imgsetpath "Z:\Fredy\A43100HemaAtac50X\Mosaic-03tif_Files"
DBsetpath "Z:\Fredy\A43100HemaAtac50X\Mosaic-03tif_Files\Medidas"
MSsetprop "POINTFEAT","COUNT"
fase1 = "ferrita"
fase2 = "ferritasegunda"
fase3 = "ferritaacicular"
if (DBexist(fase1)) : DBdelete (fase1)
if (DBexist(fase2)) : DBdelete (fase2)
if (DBexist(fase3)) : DBdelete (fase3)
if (DBexist("medidastemp")) : DBdelete ("medidastemp")
if (DBexist("medidas")) : DBdelete ("medidas")
image = "*.tif"
while 1
 imgsetpath "Z:\Fredy\A43100HemaAtac50X\Mosaic-03tif_Files"
 imgenum image,1
 if (not _STATUS): break
 imgload image,1
 write image
 imgRGB2grey 1,1
 imgpal2RGB 1,1
 write
 Gclear 0
```

```
MSmarker 2,130.0,103.0,50,50,15,1,2
Gmerge 1
MSmeaspoint 1,"ferrita",1,12,1,1,2,2,1
Gmerge 1
MSmeaspoint 1,"ferritasegunda",1,10,1,1,2,2,1
Gmerge 1
MSmeaspoint 1,"ferritaacicular",1,14,1,1,2,2,1
Gmerge 1
imgsetpath"Z:\Fredy\A43100HemaAtac50X\Mosaic03tif_Files\Medidas"
update
imgsave 1, image
imgsave 1, image
endwhile
DBmerge "ferrita",1,"ferritasegunda",1,"medidastemp"
DBmerge "medidastemp",11, "ferritaacicular",1,"medidas"
datalist "medidas",0,1
DBdelete fase1
DBdelete fase2
DBdelete fase3
```

9.2. Aquisição de imagens em mosaico

Os mosaicos das 5 amostras foram obtidos a partir de um overview de cada amostra. As amostras mostram os riscos feitos para distinguir os 3 mosaicos e são apresentados a seguir.

Figura 66 – Overview da amostra A

Figura 67 – Overview da amostra B

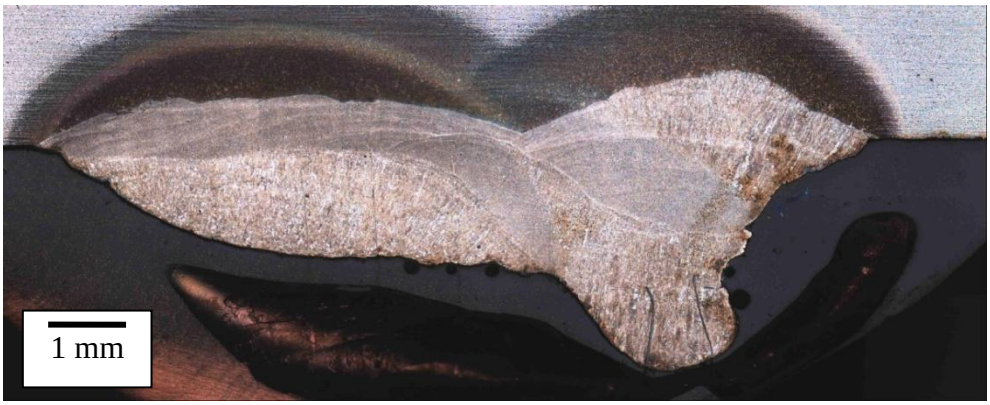

Figura 68 – Overview para a amostra C

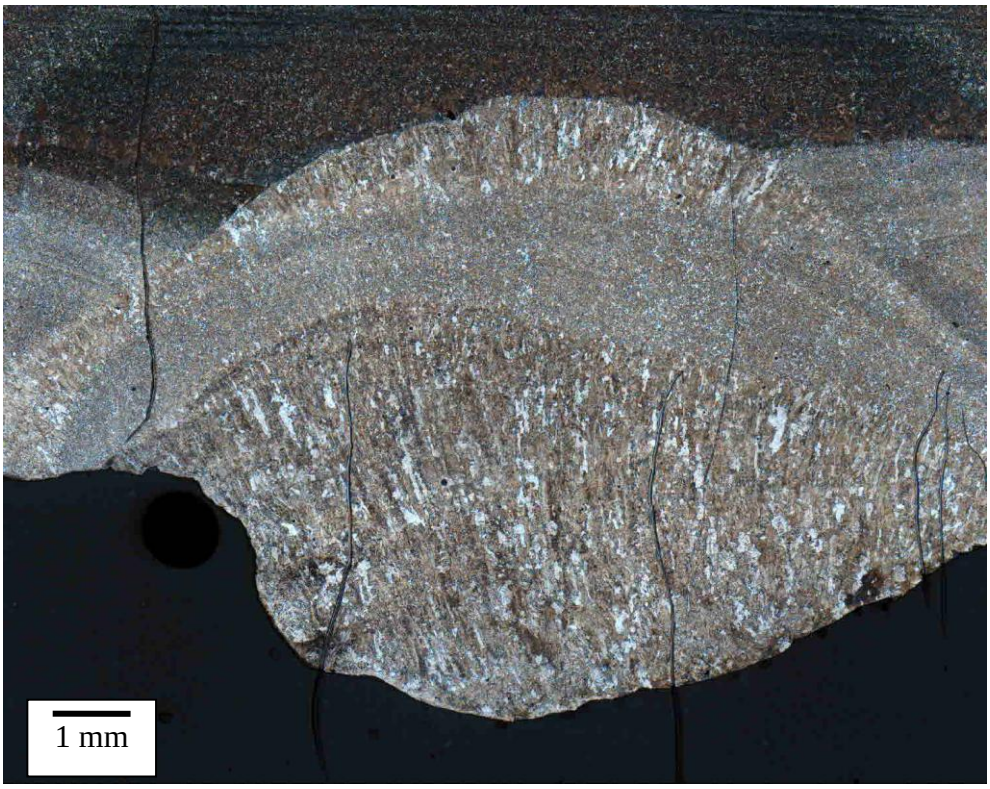

Figura 69 – Overview para a amostra D

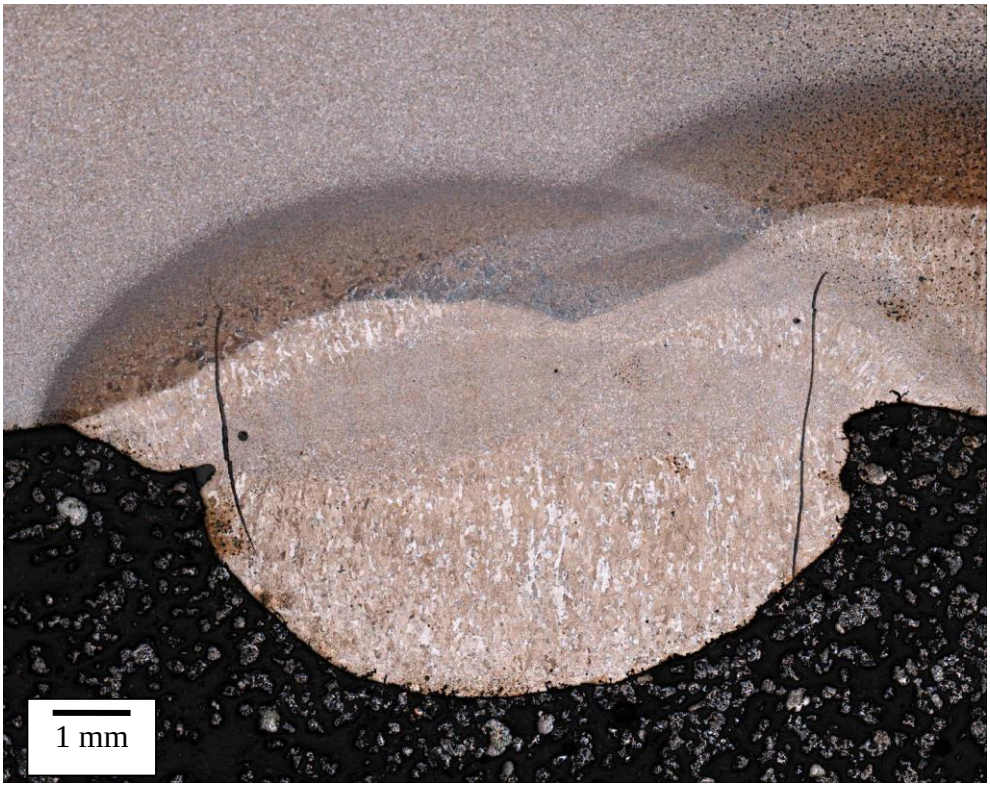

Figura 70 – Overview para a amostra E