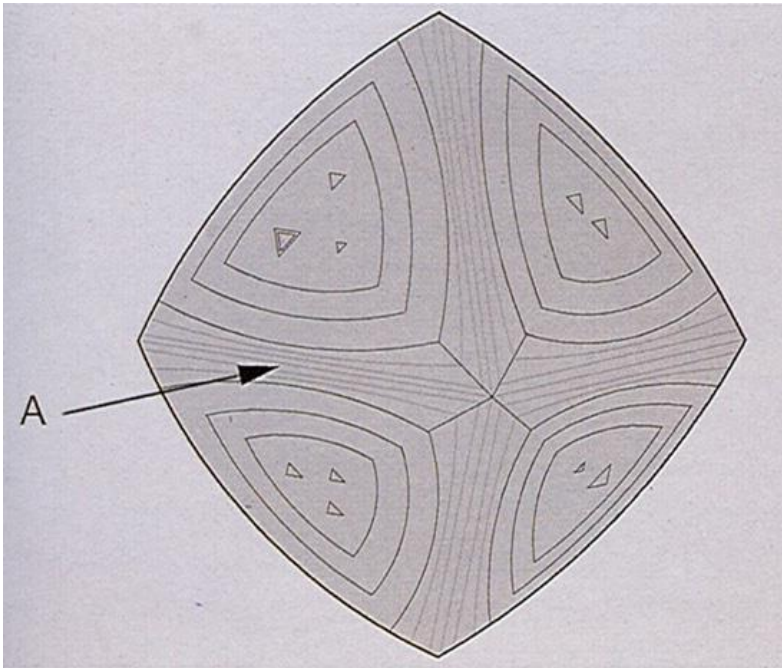


# La cathodoluminescence au MEB comme méthode d'identification des diamants naturels et synthétiques

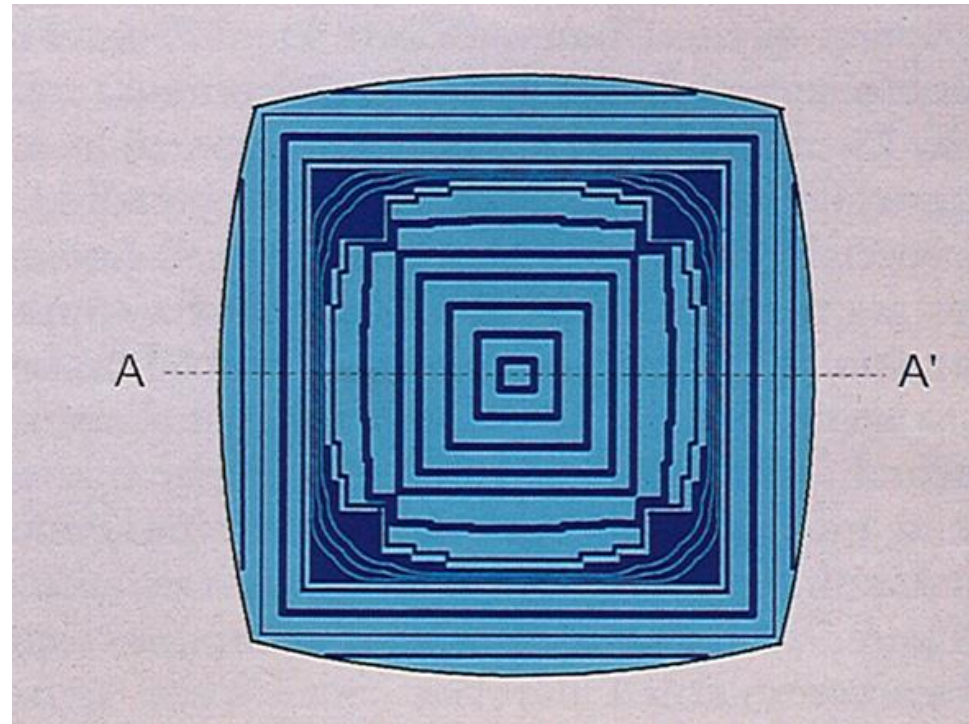
Emmanuel FRITSCH, Benjamin RONDEAU,  
Université de Nantes  
Thomas HAINSWANG  
Laboratoire GGTL-Liechtenstein



**Naturel ou synthétique?**  
**La différence ne se voit pas à l'œil nu.**



**Diamant naturel**  
Octaédrique  
(+cuboide)  
dissous



DB verification instruments G&G FI 96



750

SEI

20kV

500µm

x30

SMEBMN

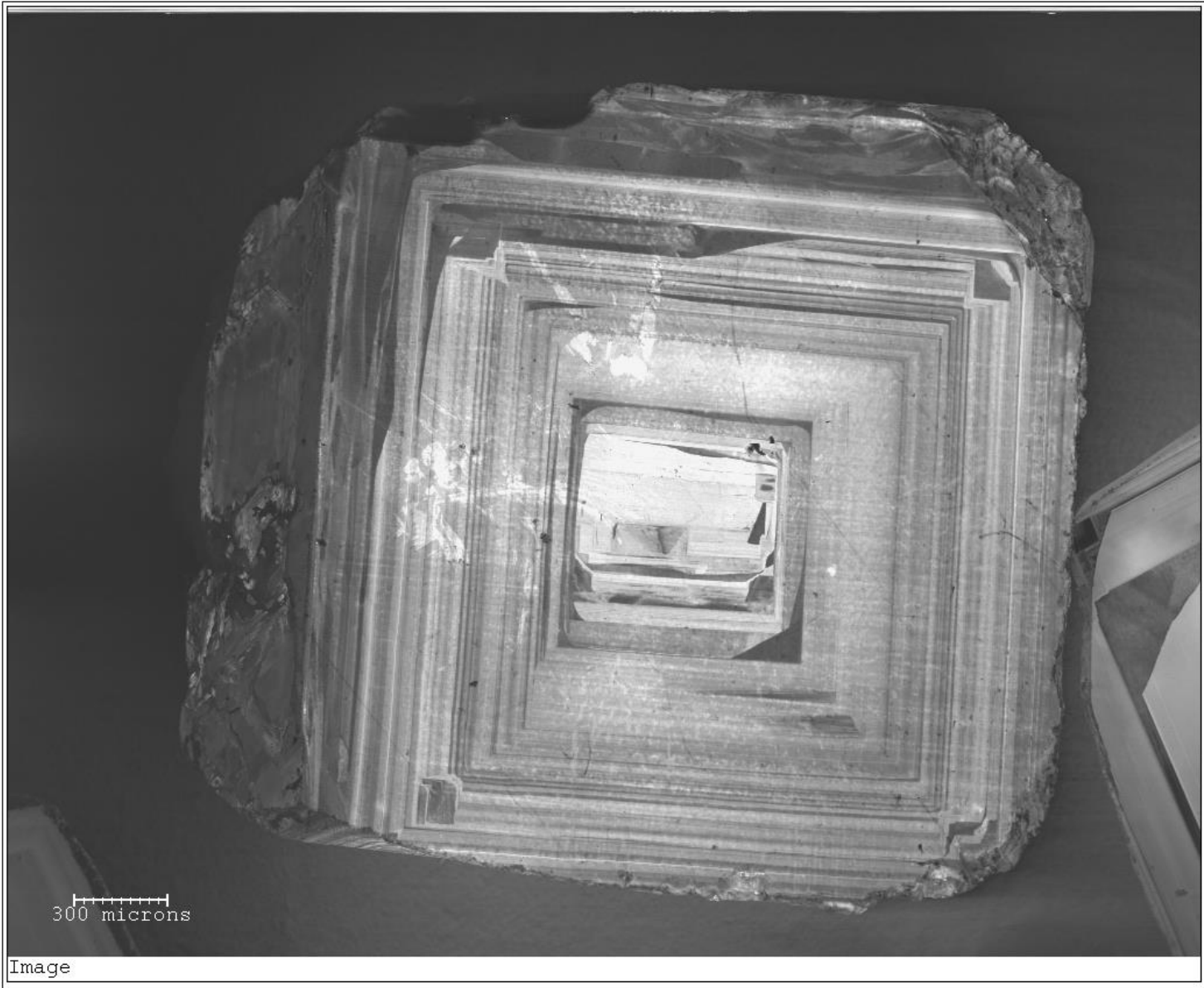
0273

10kV

1mm

x19





Image

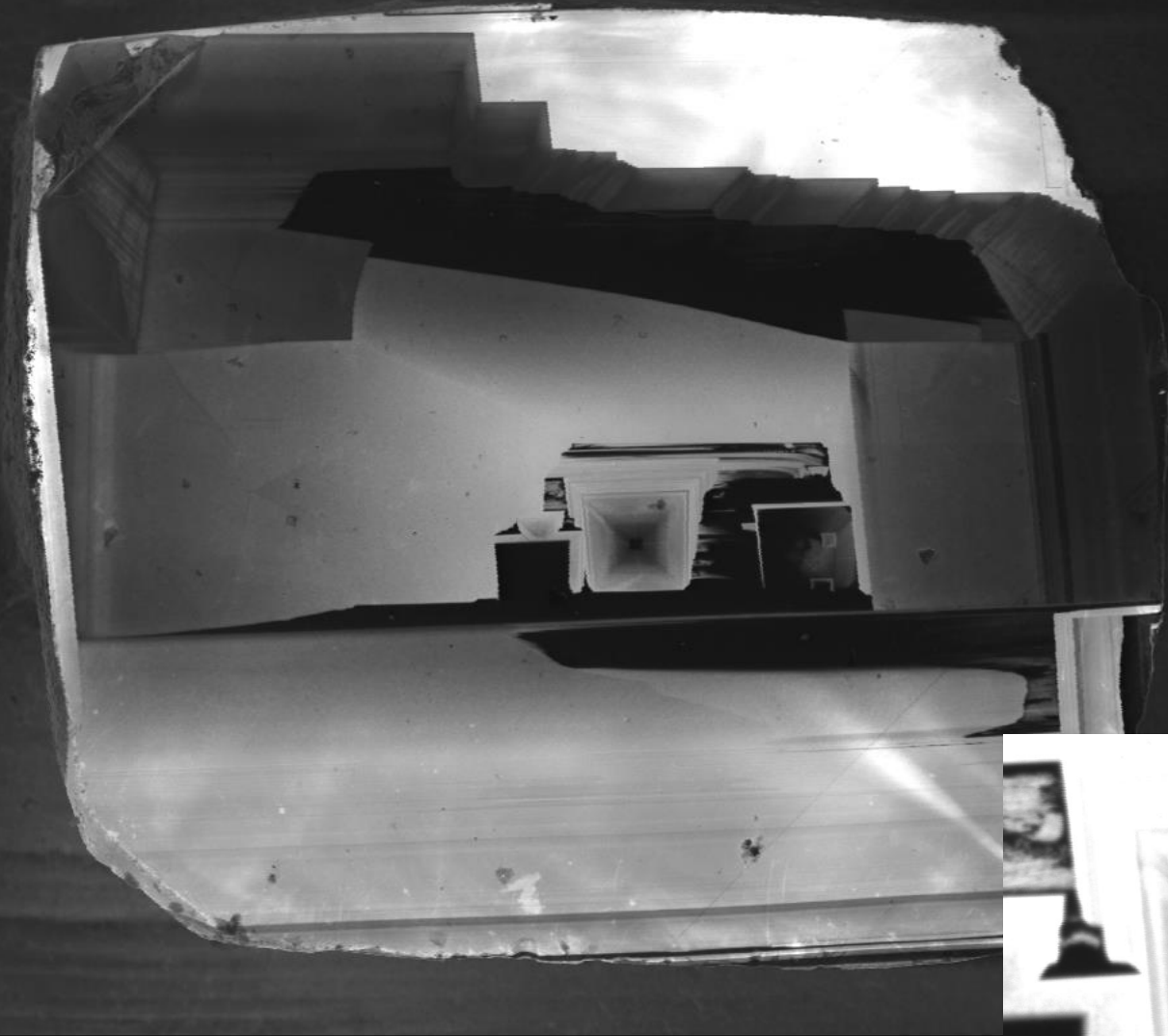


SMEBMN

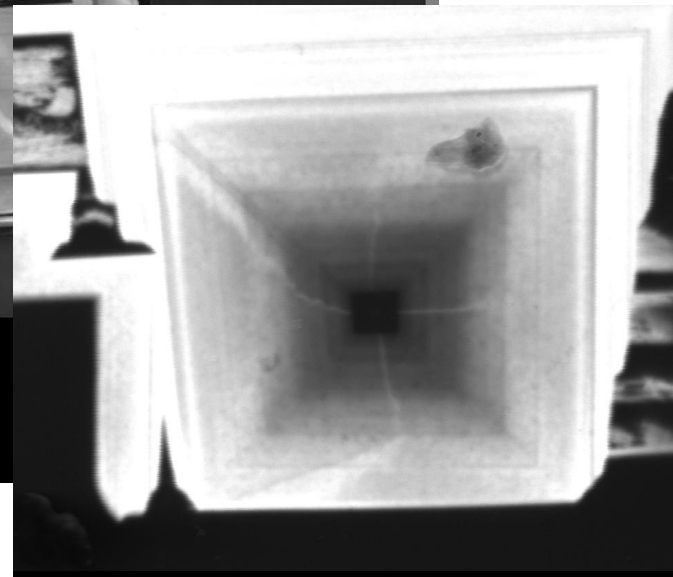
0259

20 kV 500 μm

x43



SMEBMN 0261 20kV 500µm



SMEBMN 0262 20kV 50µm x3



SMEBMN

6451

20kV

500µm

x33



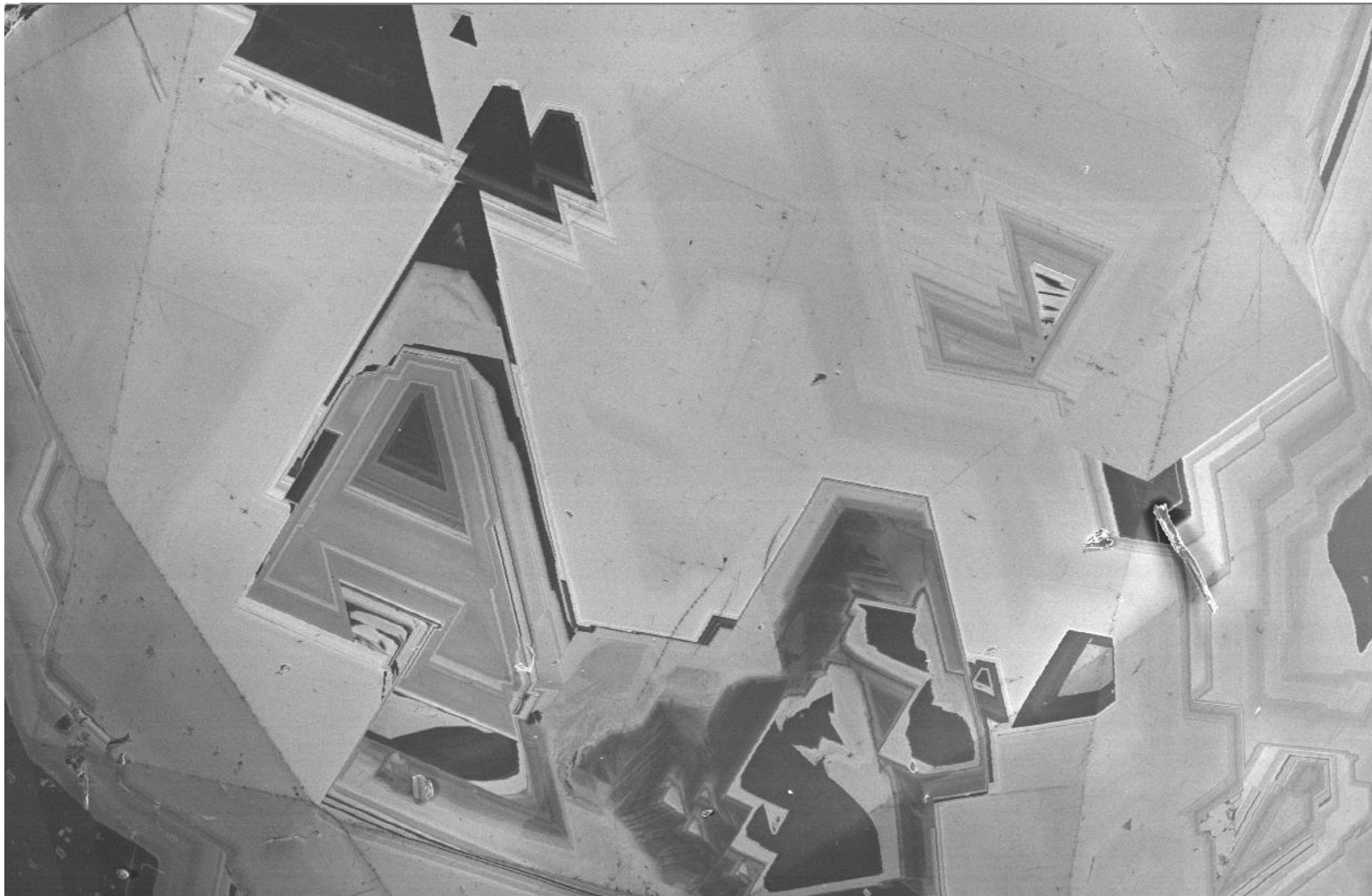
SMEBMN

51256

20 kV

200  $\mu$ m

x75



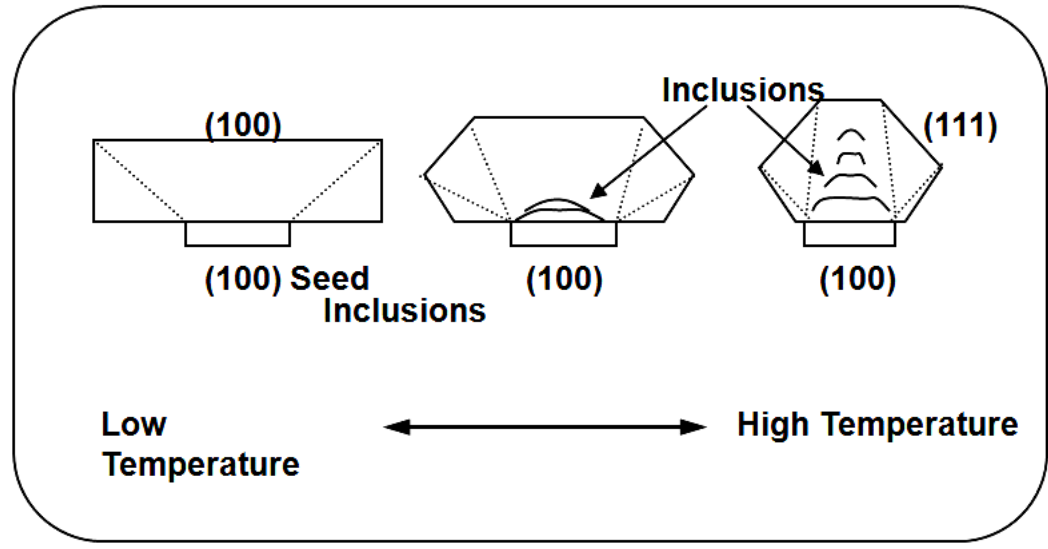
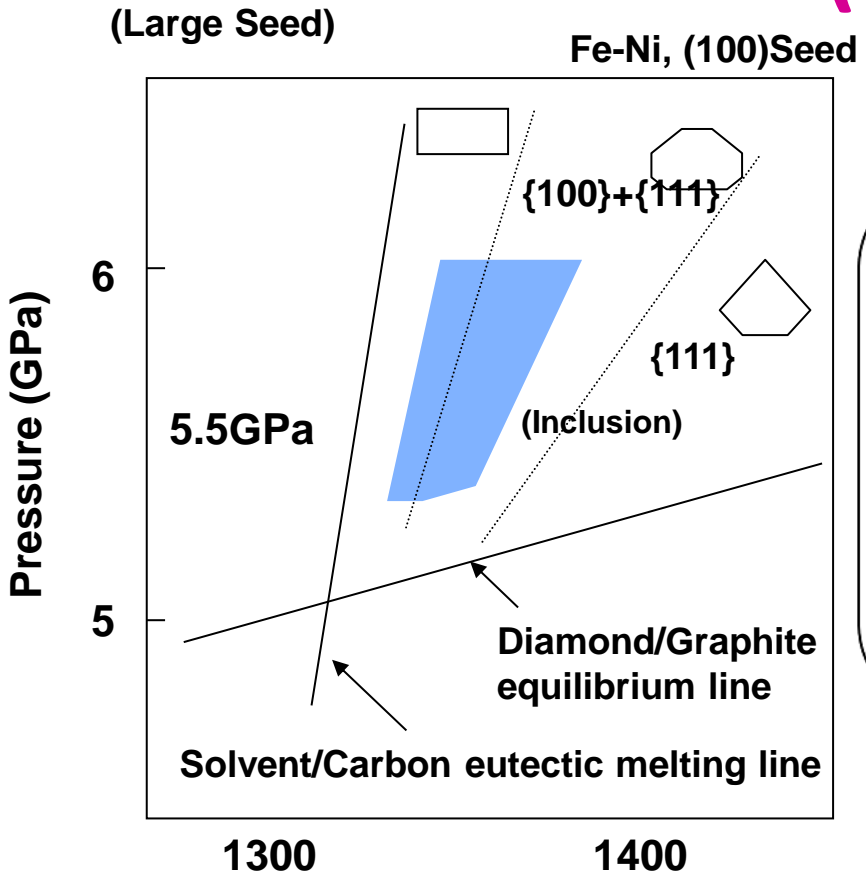
204

01032

12kV 200 μm

x70

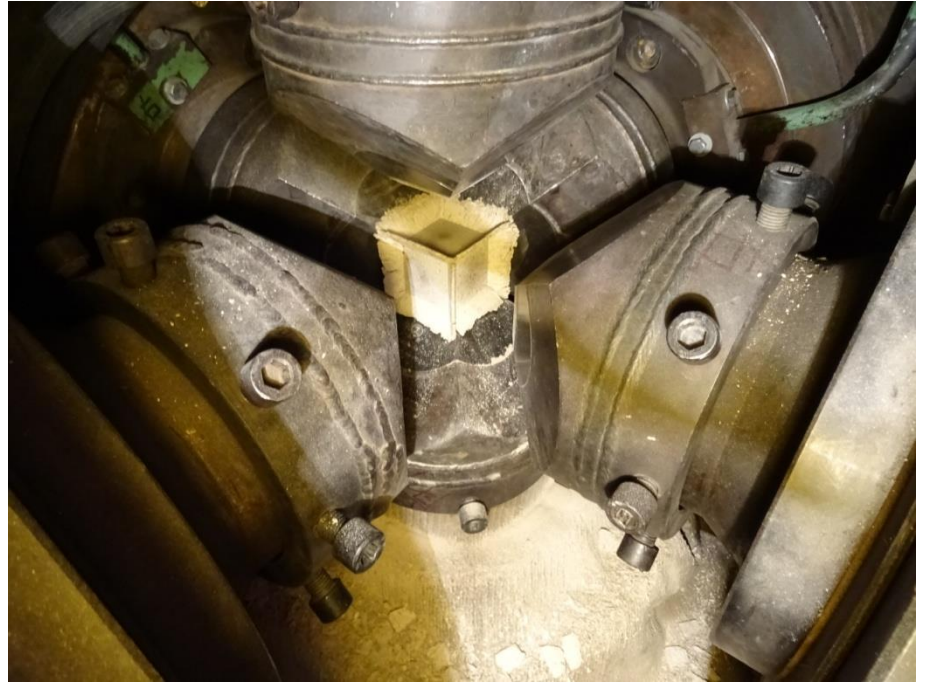
# Synthétique: Croissance en solvant ( métal fondu) à Haute Pression et Haute Température (HPHT)



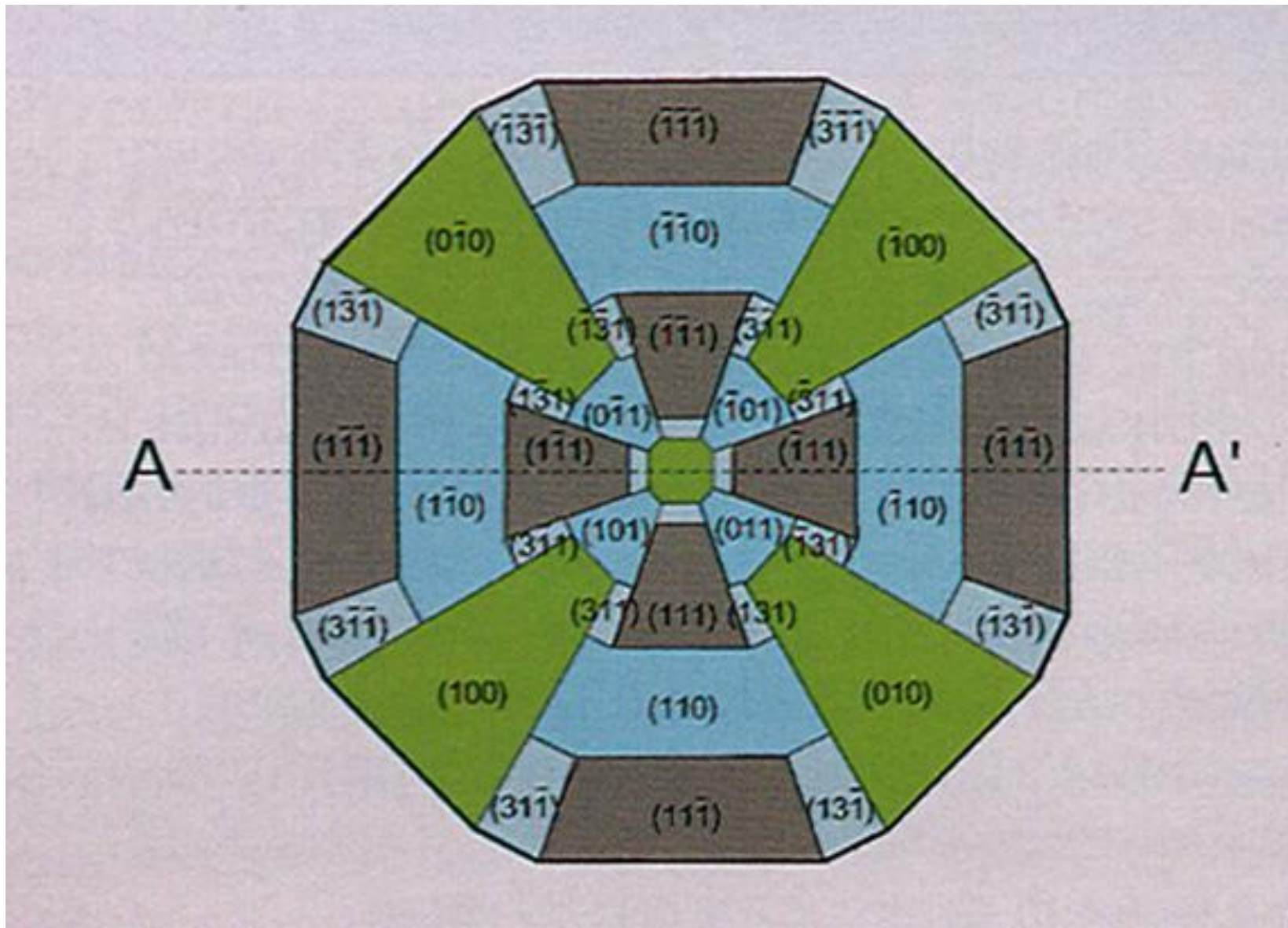


Méthode HPHT  
Zhengzhou, Chine

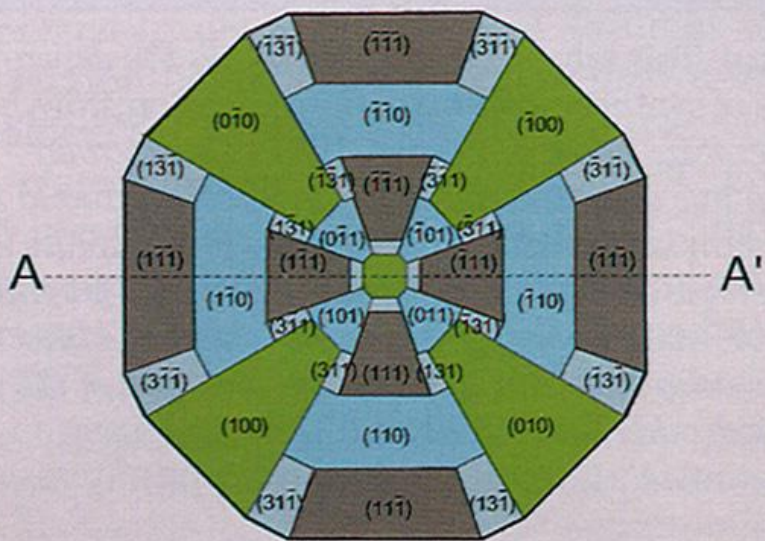
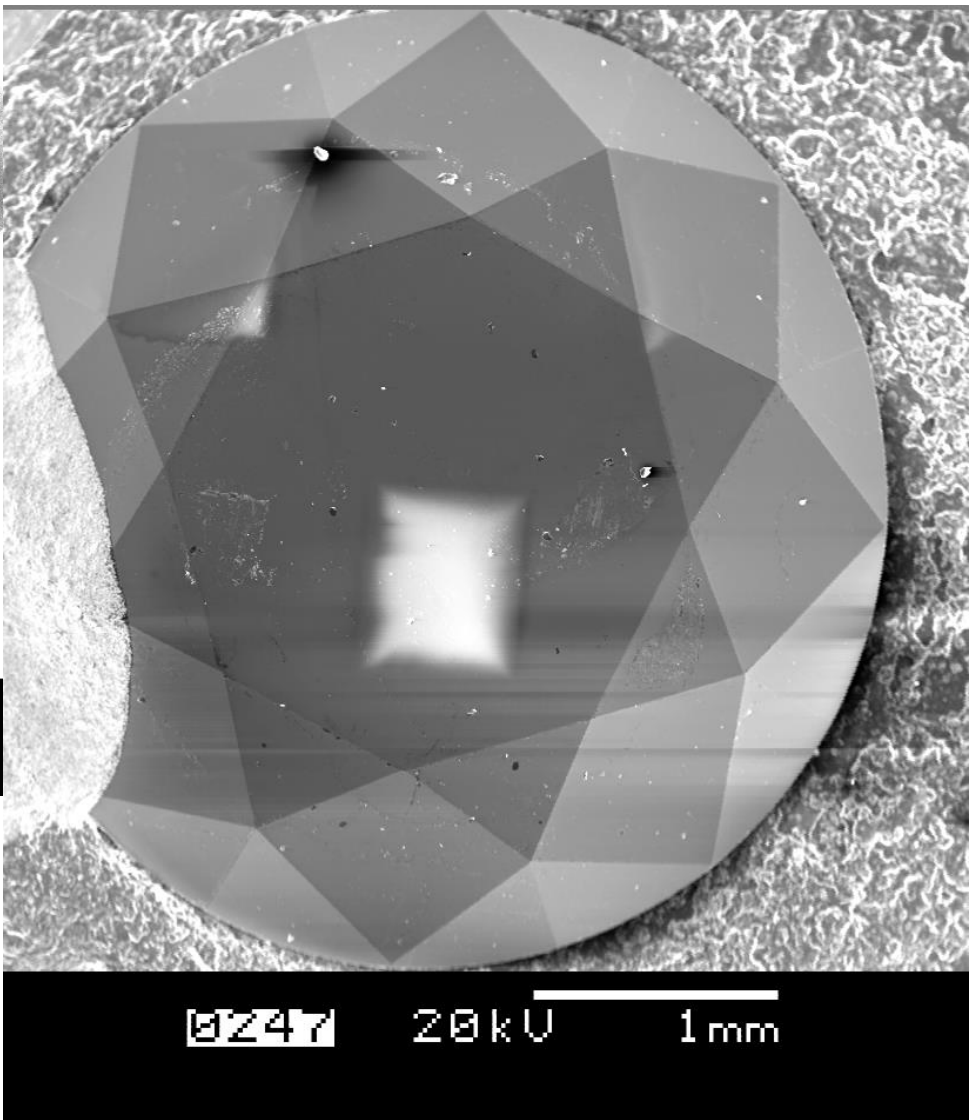
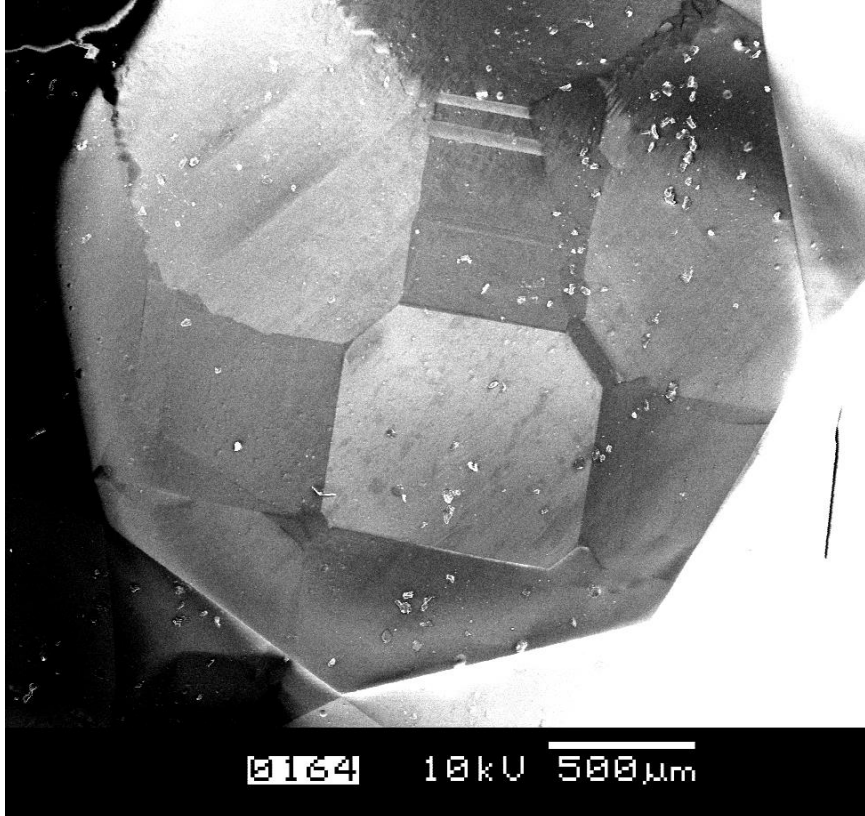
50 kBar, 1350°C





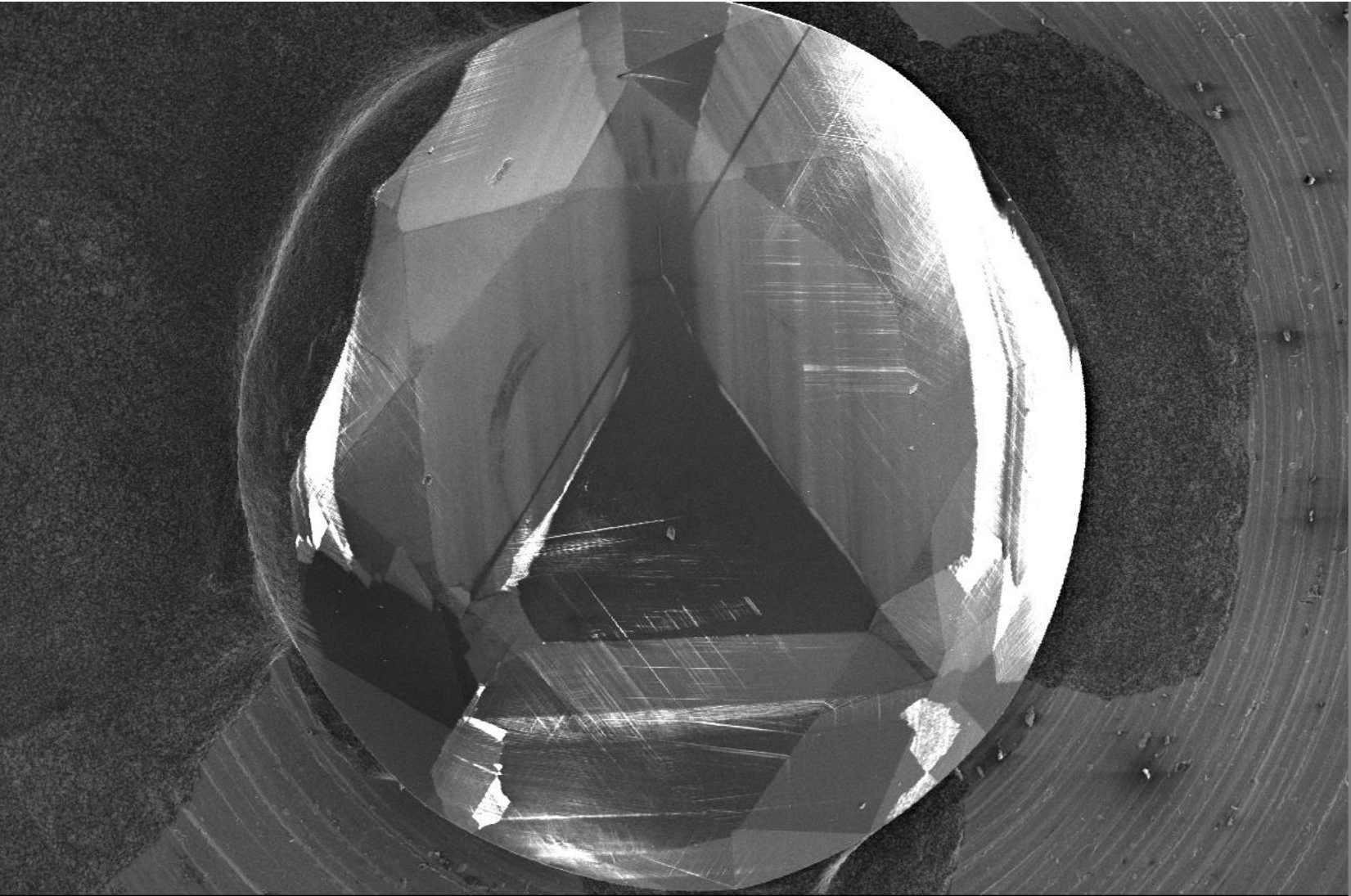






Synthétiques Ib Jaune brun





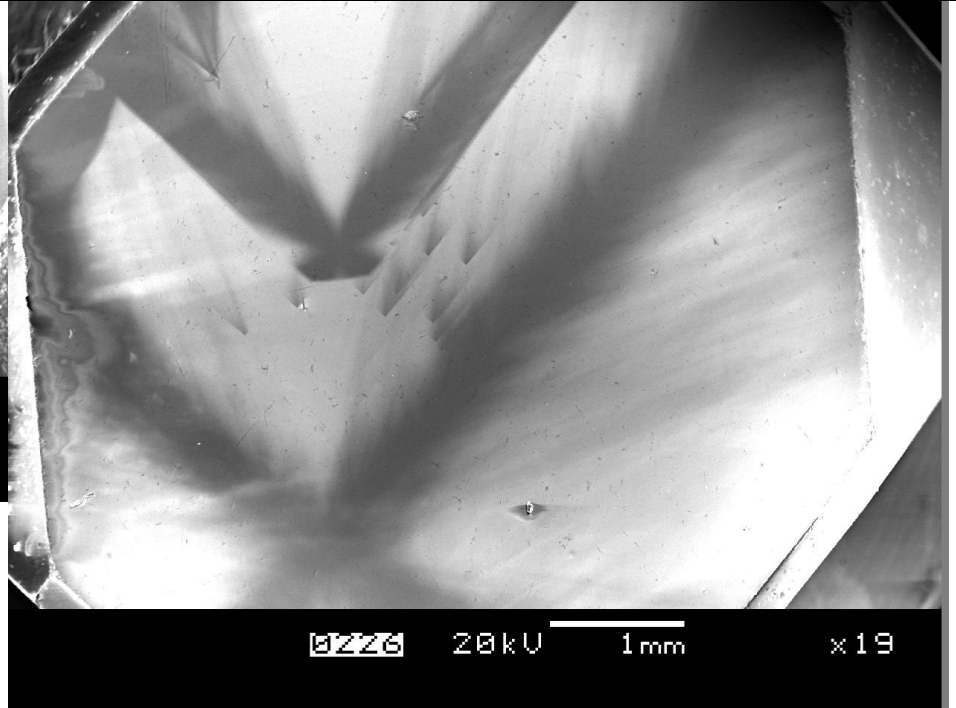
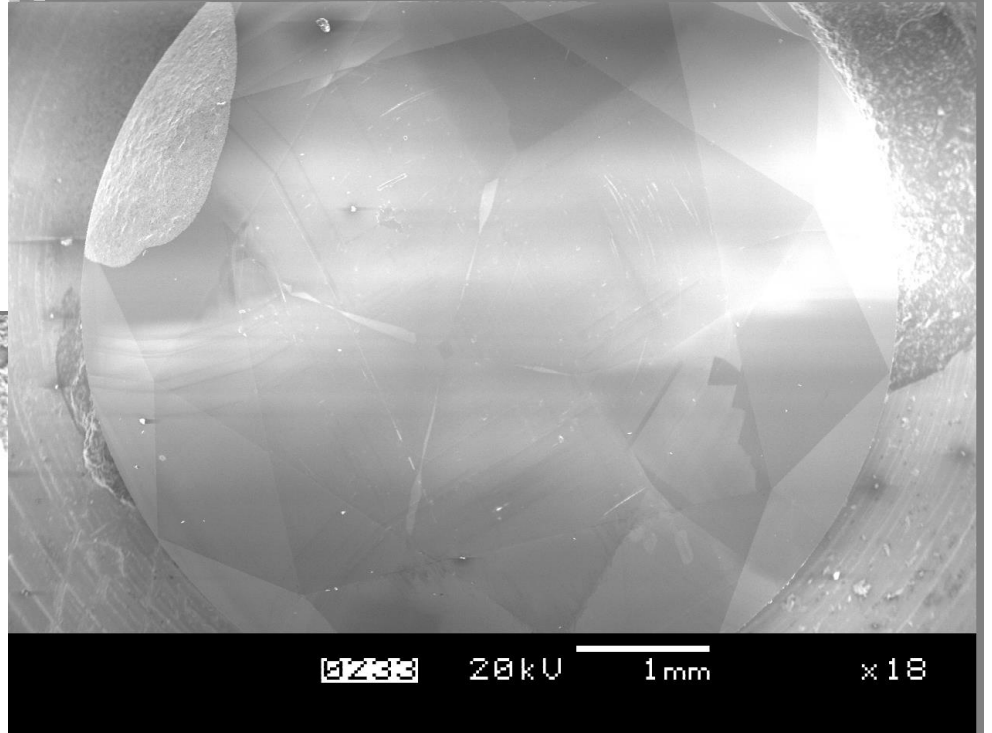
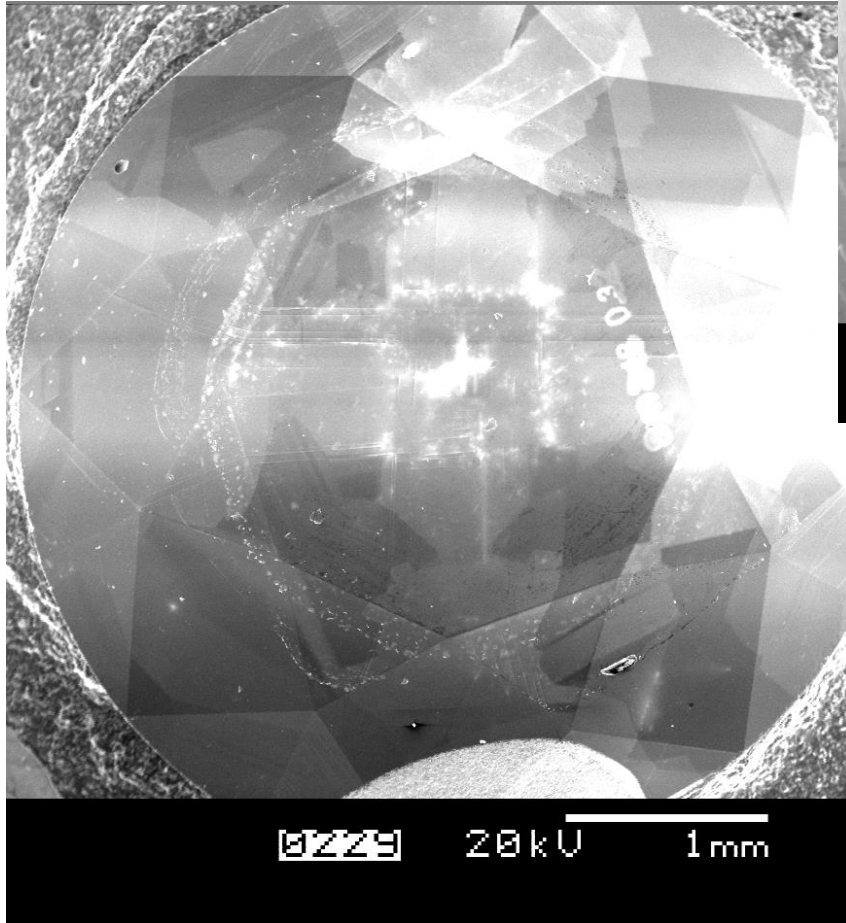
204

0021

12kV 500µm

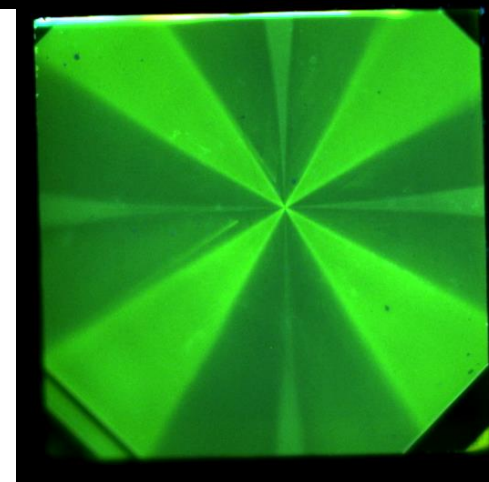
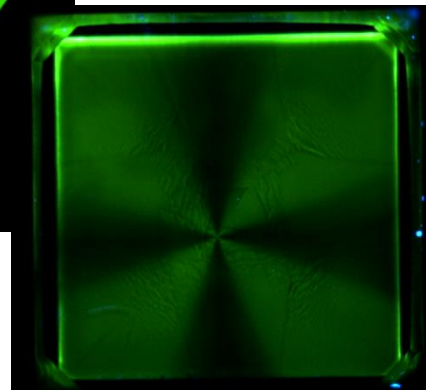
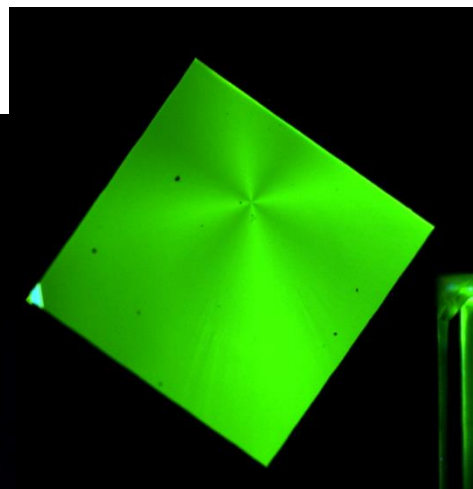
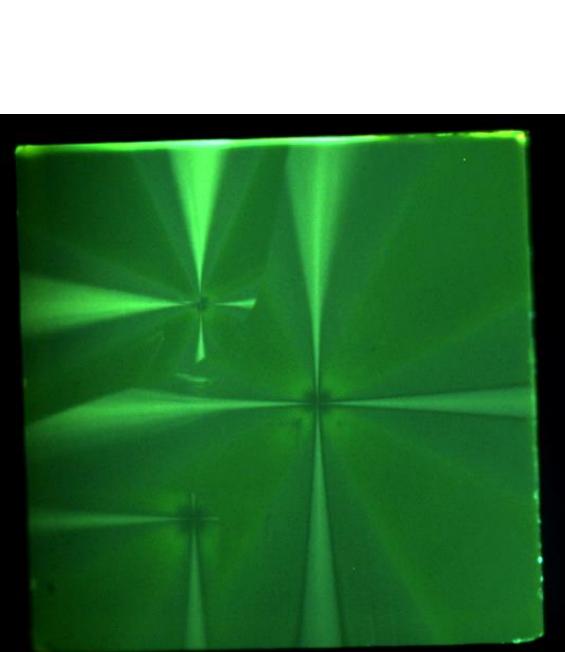
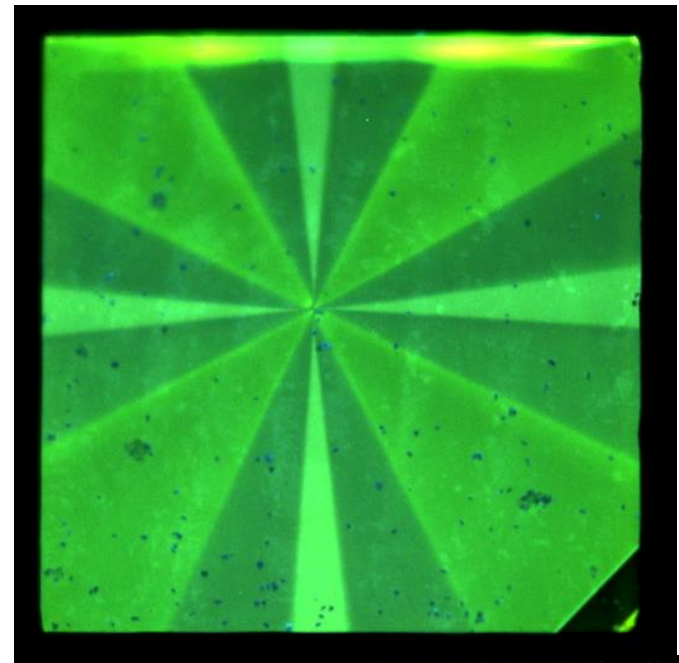
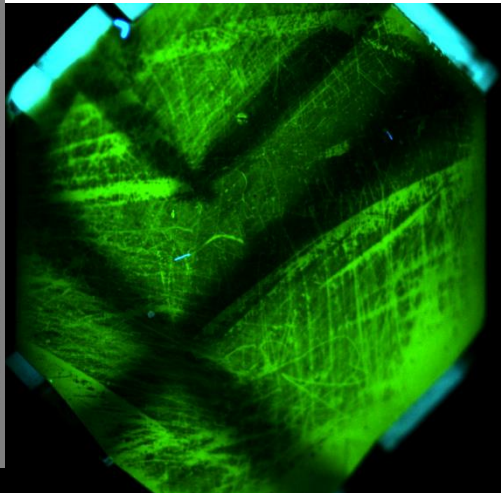
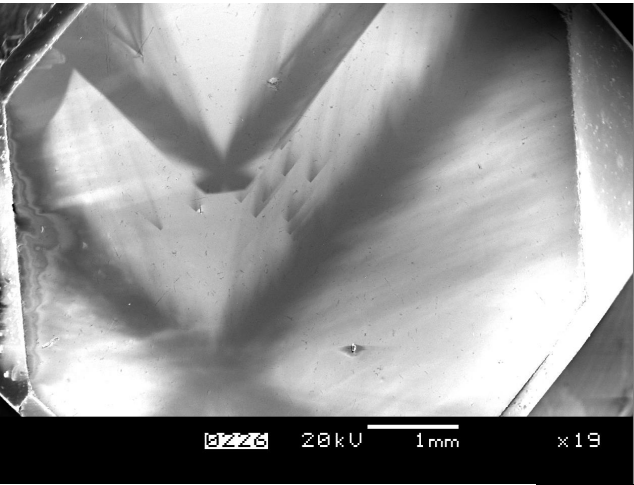
x35

Synthétique au Co

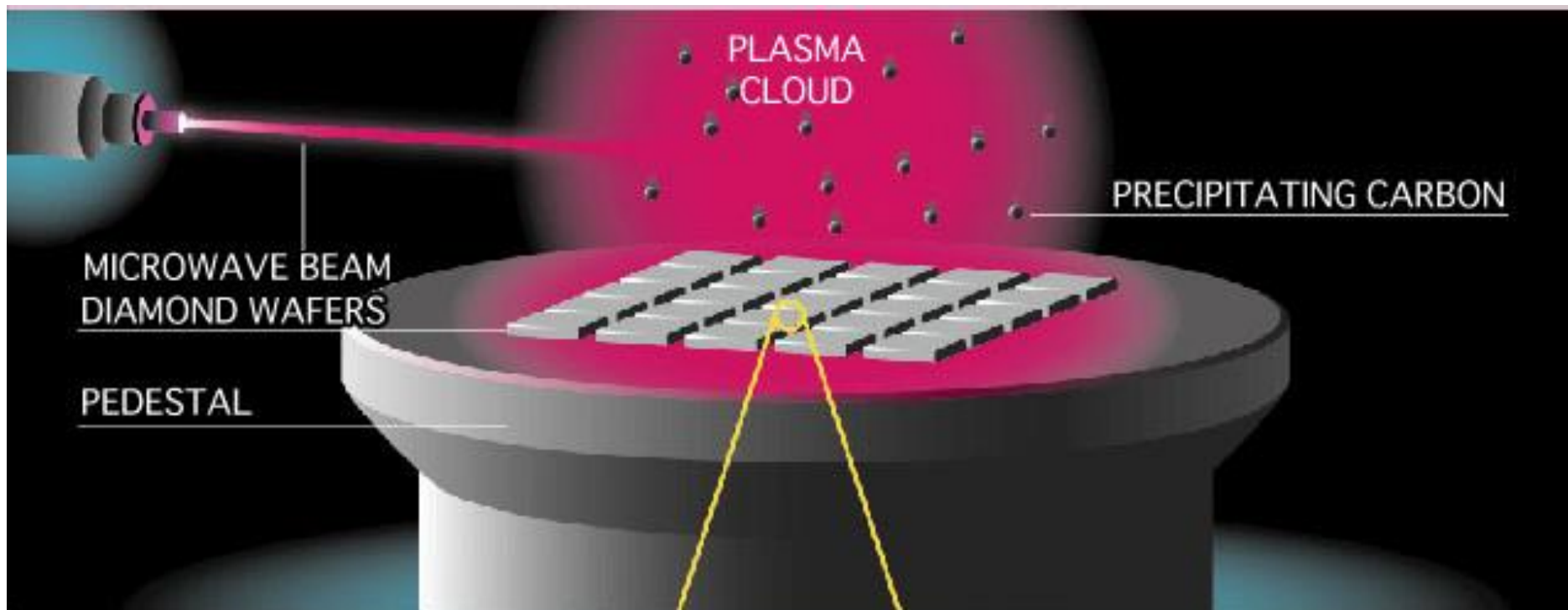


Synth IIa  
incolores

# Maltese-Cross effect

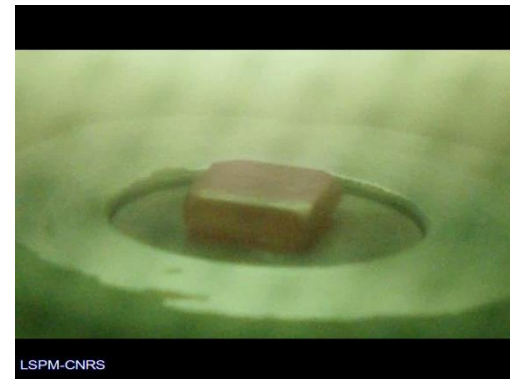
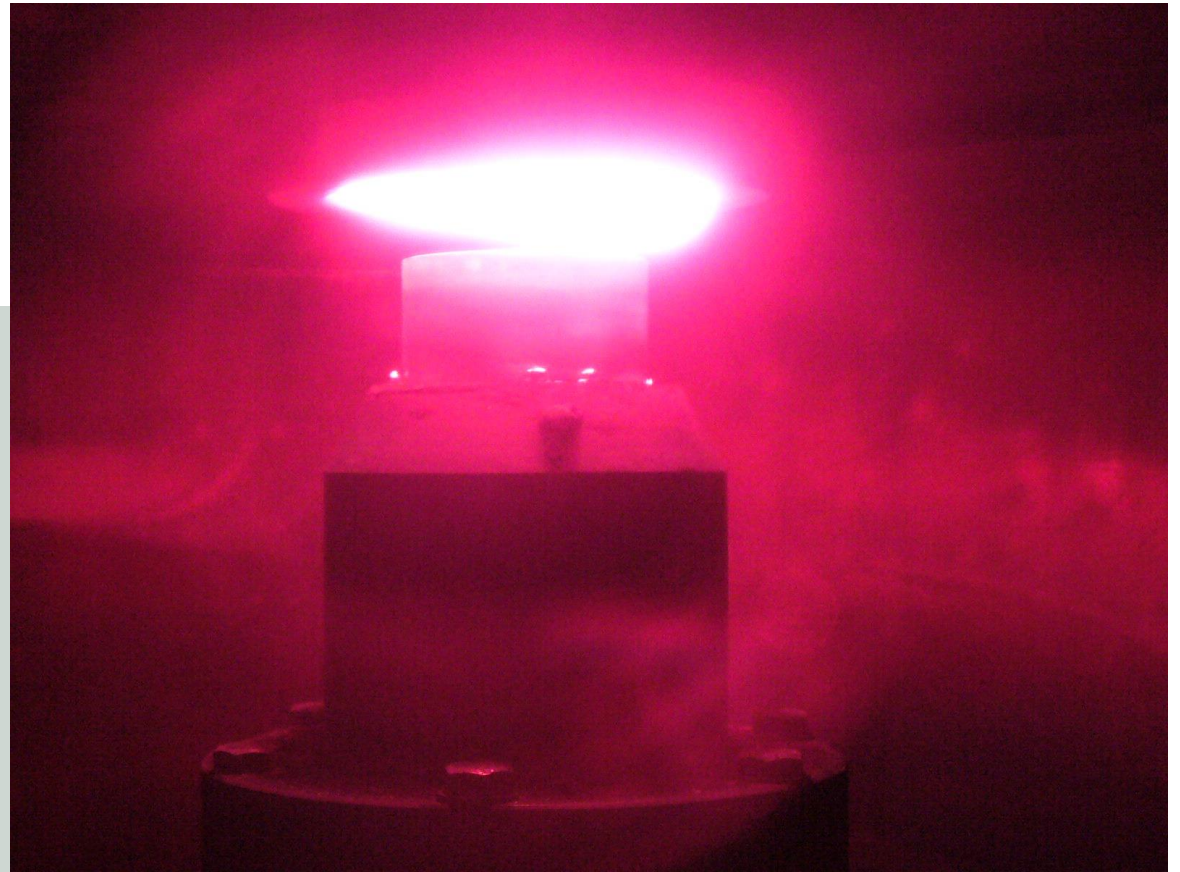


# Synthétique: croissance en phase vapeur Chemical Vapor Deposition (CVD)





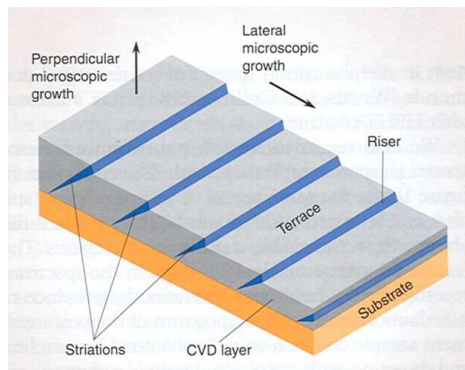
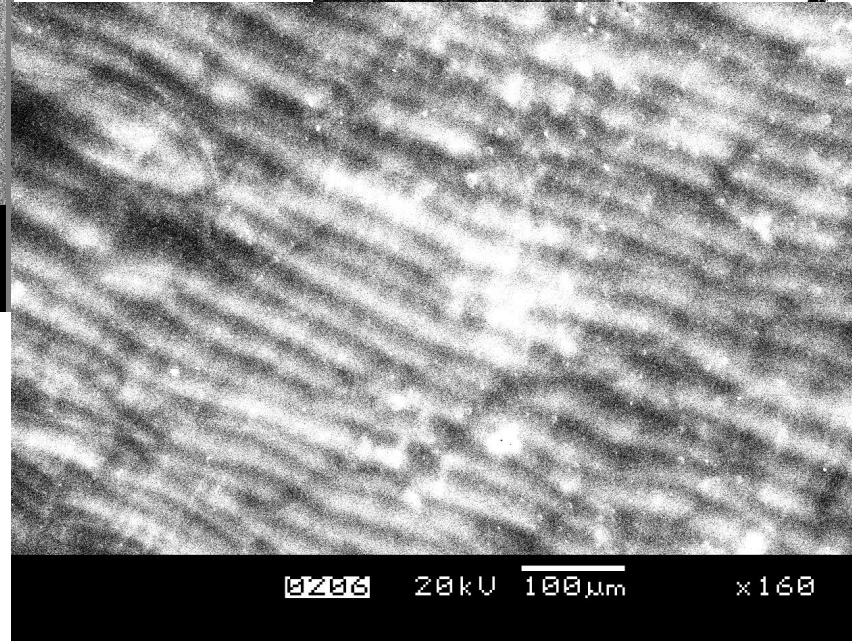
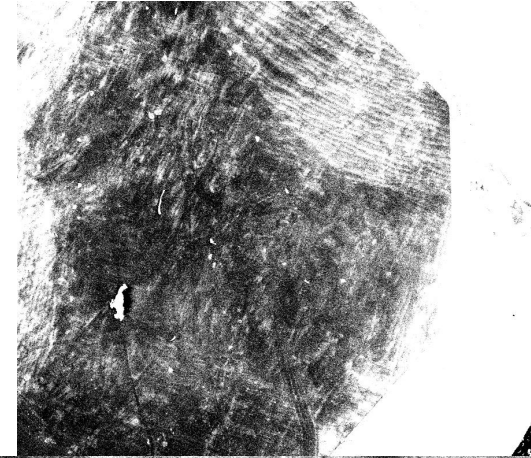
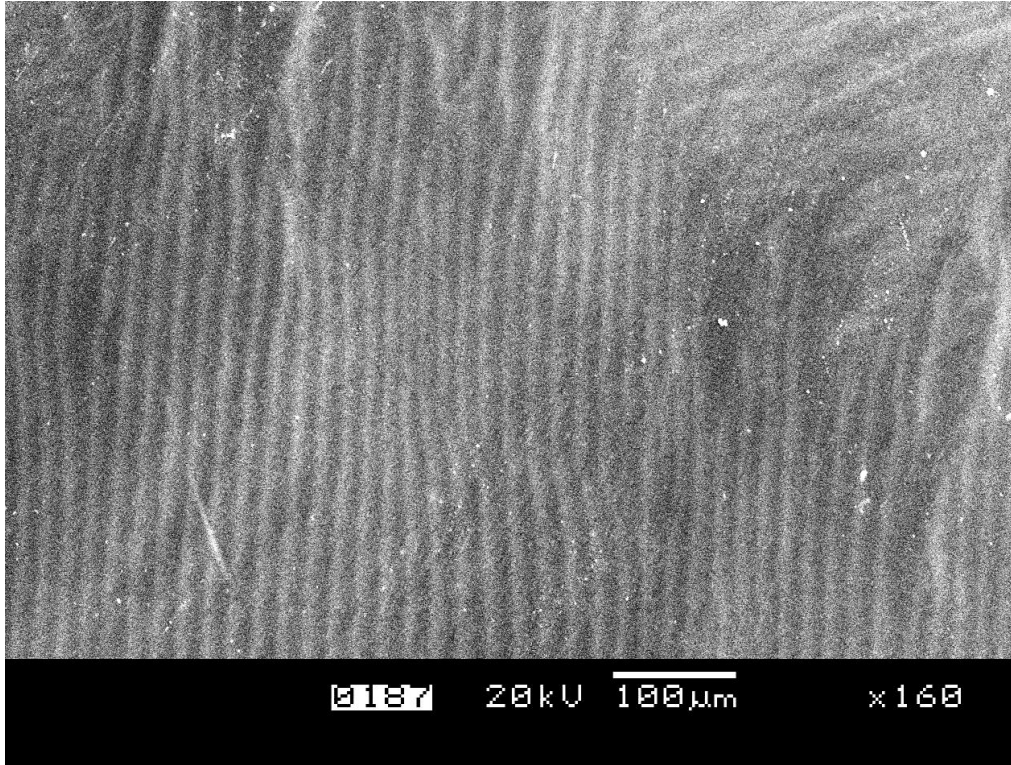
# Croissance hors équilibre



LSPM-CNRS

# Identification

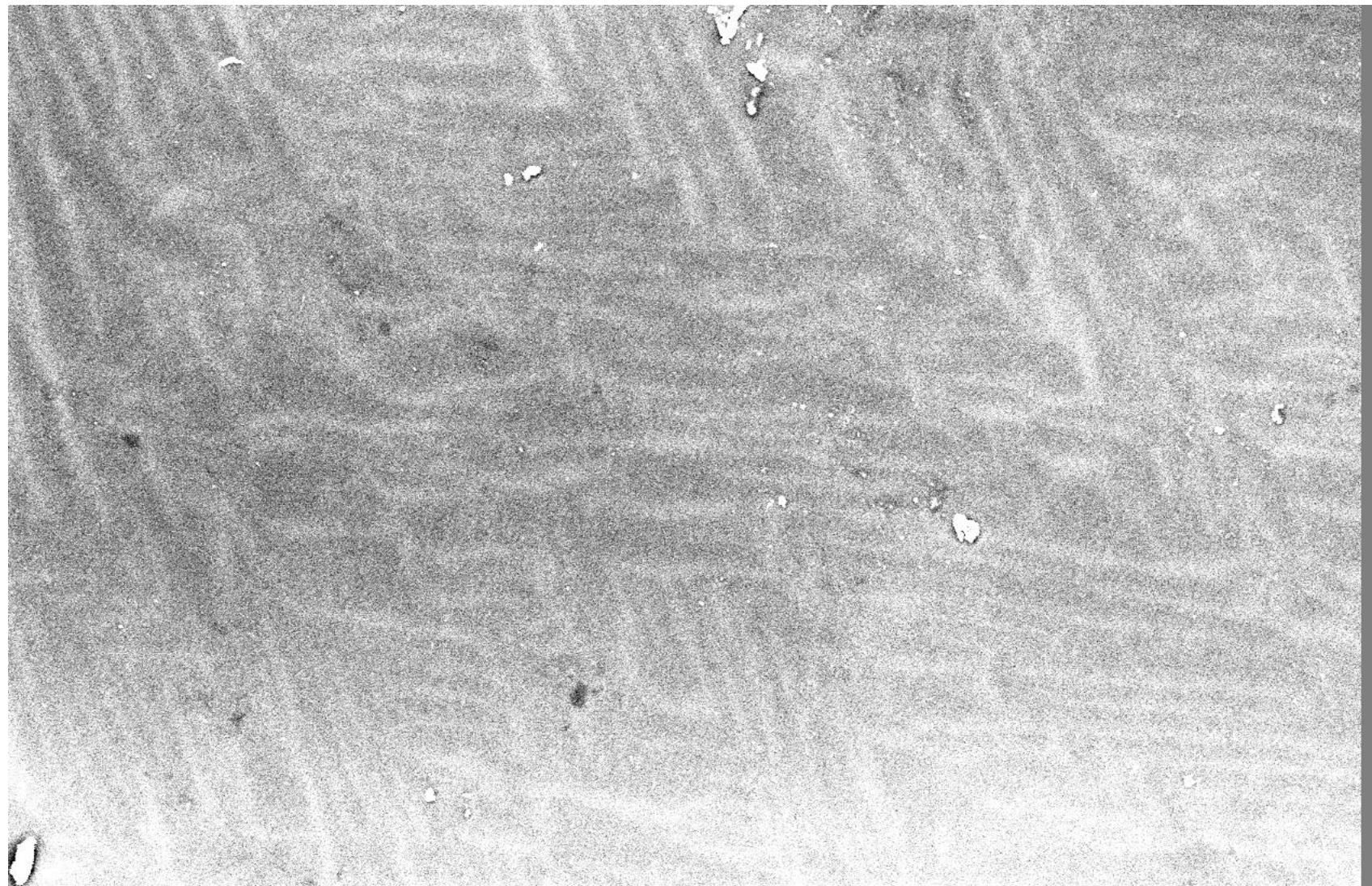
## Cathodoluminescence (MEB Nantes)



0.46 ct CVD Incolore

CVD incolores  
« Step flow growth »  
zèbrures

0.48 ct CVD Incolore



0185

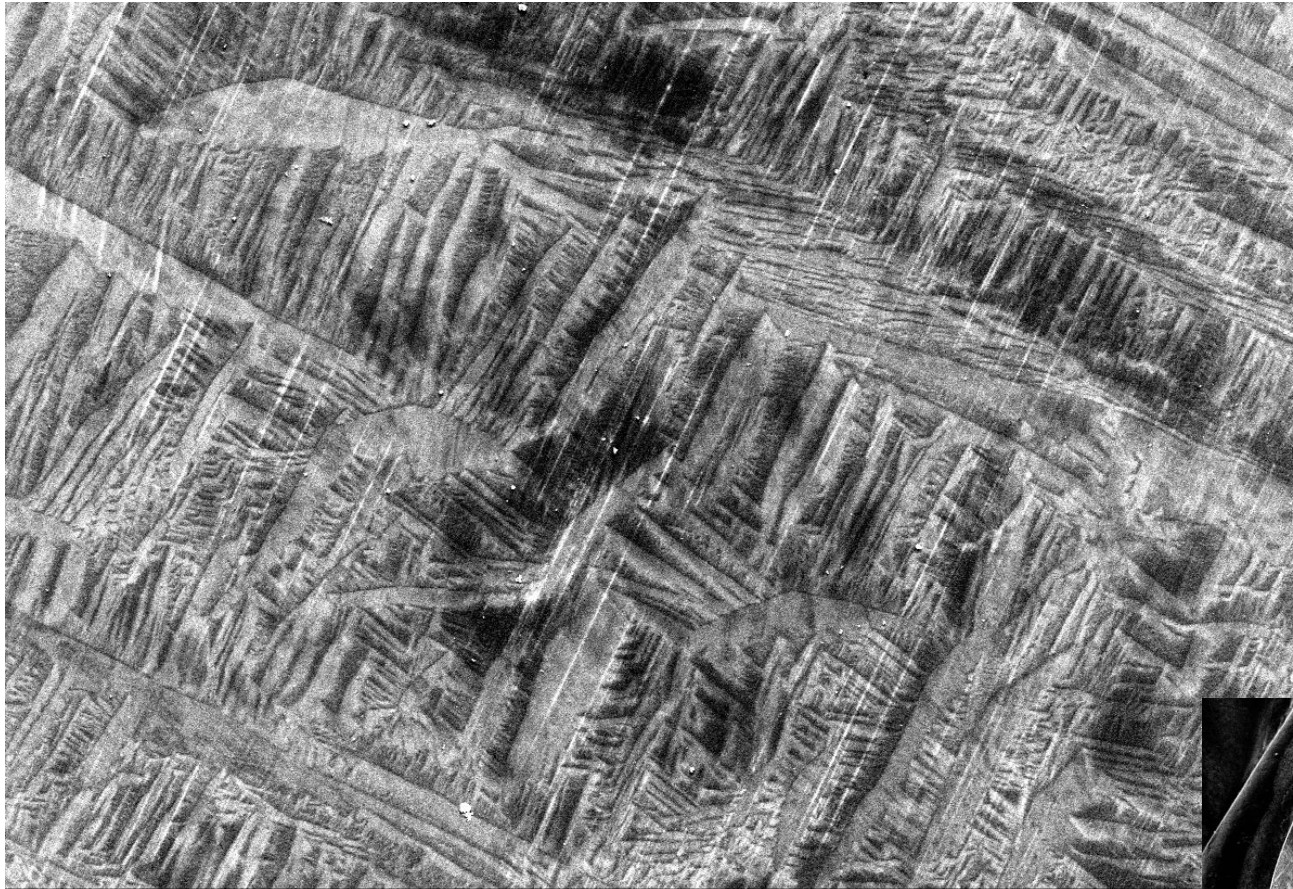
20kV

100µm

x150

O.45 CVD CL 20KeV

# Retour aux naturels: quelques monstres



IMN

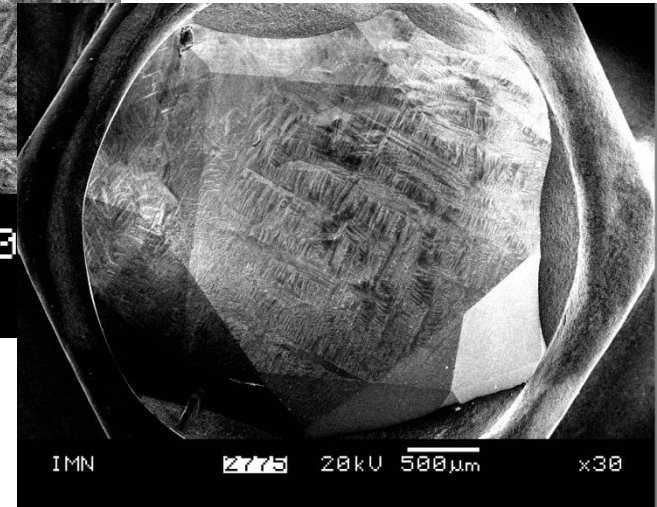
2780

20kV

100µm

x10

TH2-333 S1  
dendrites



IMN

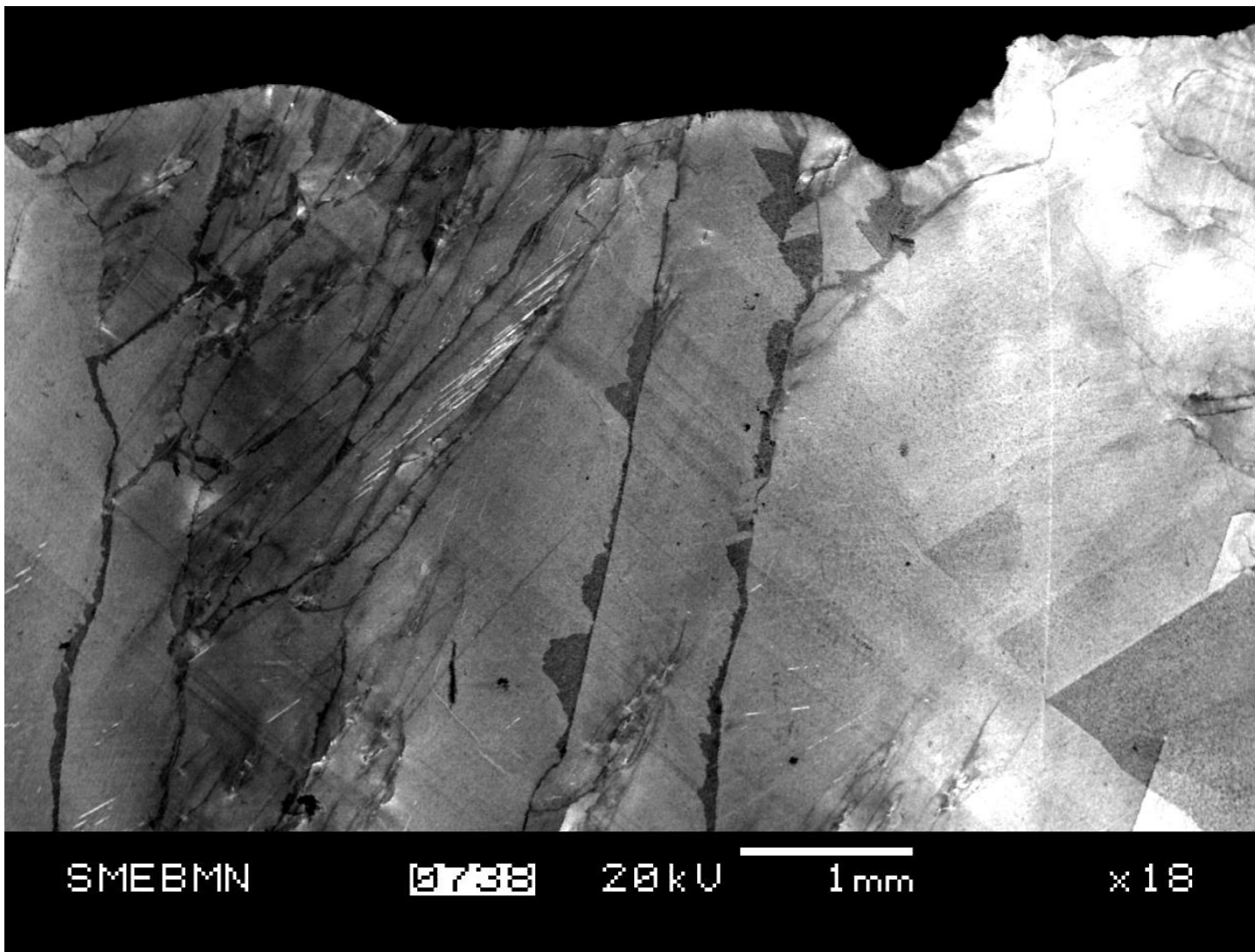
2775

20kV

500µm

x30

# Des diamants brisés, recollés

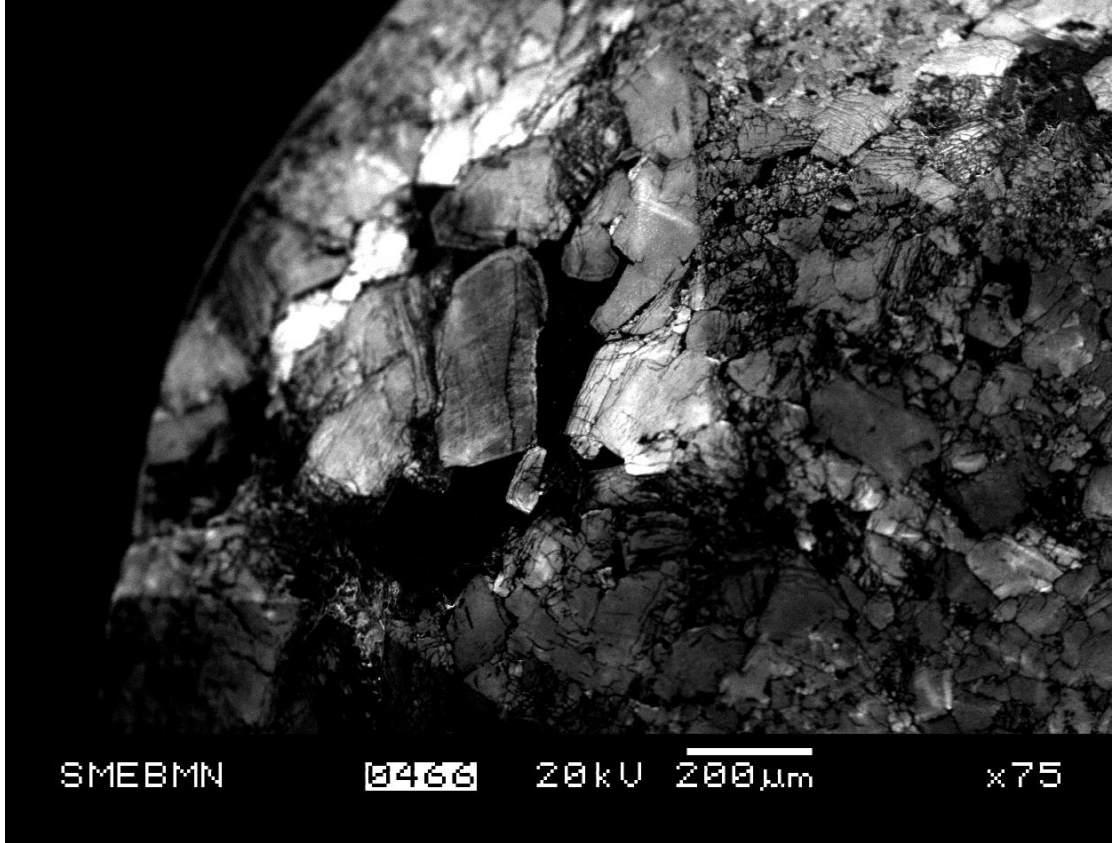


200 microns

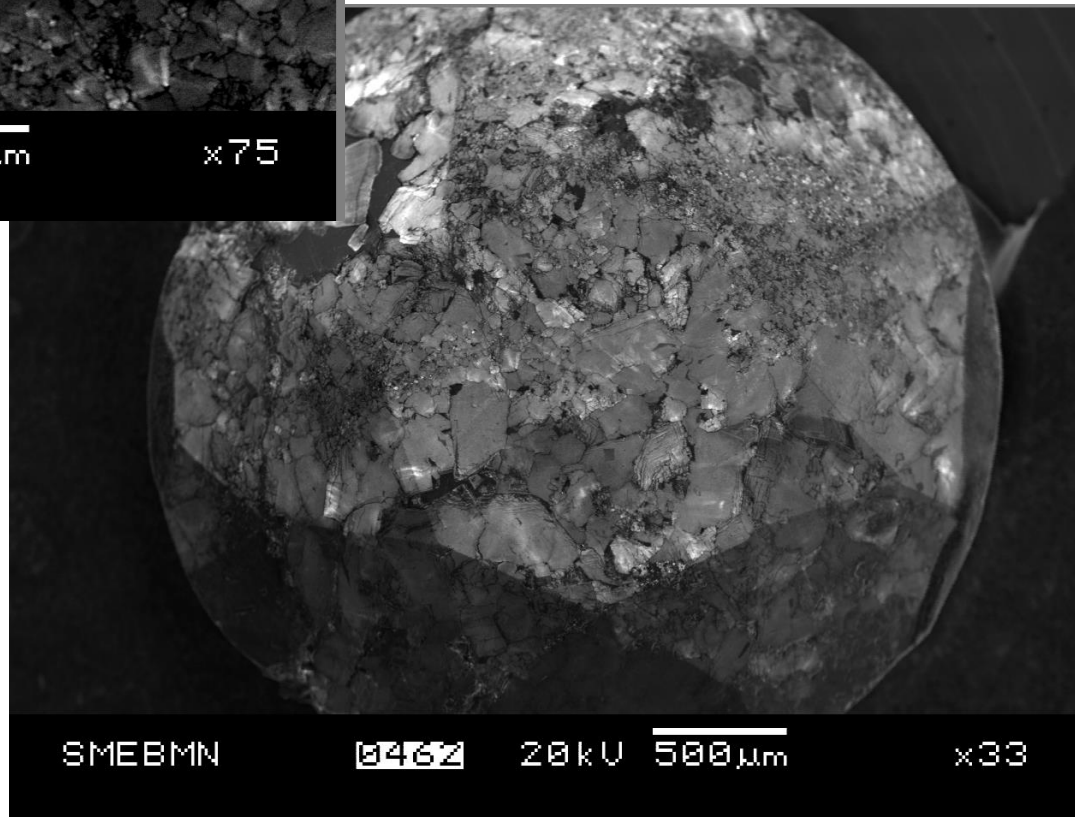


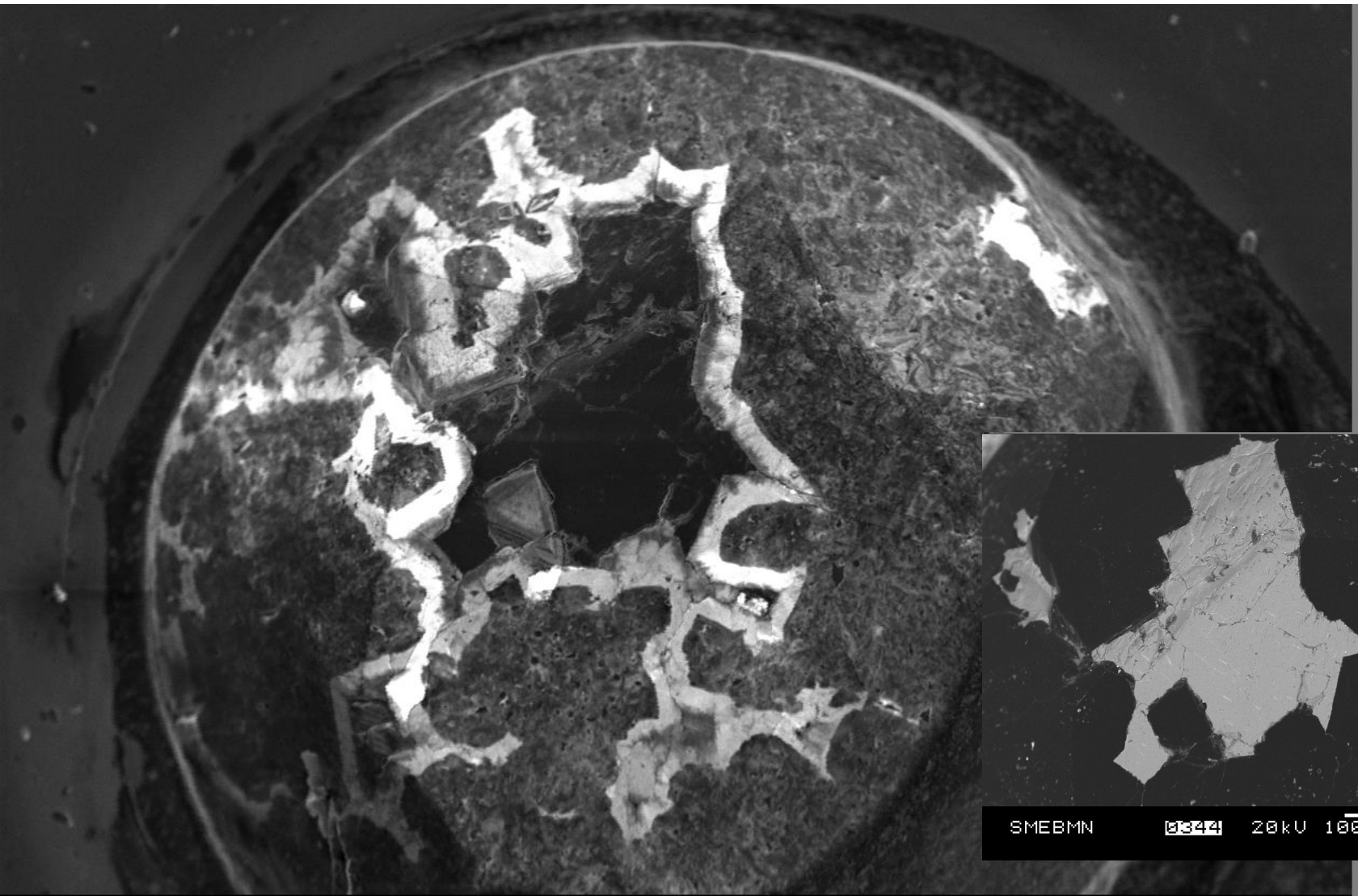
Diamant THDUG28

DUG 28



1033



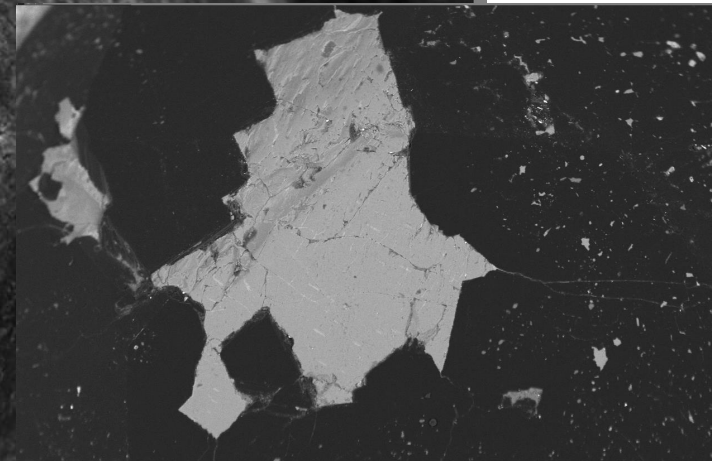


SMEBMN

0345

20kV 200µm

x55



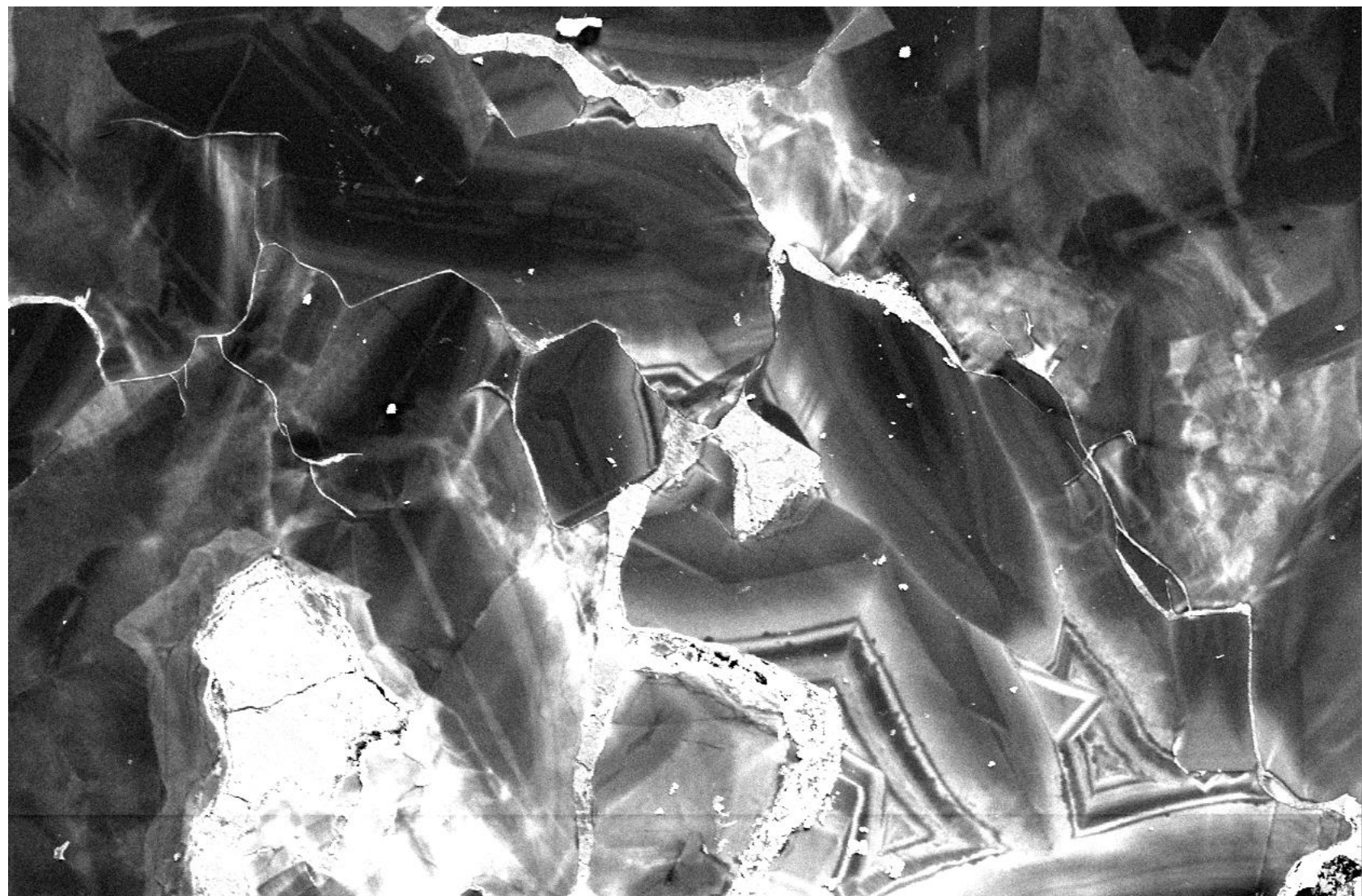
SMEBMN

0344

20kV 100µm

x110

1027 Rutile TiO<sub>2</sub>



SMEBMN

0477

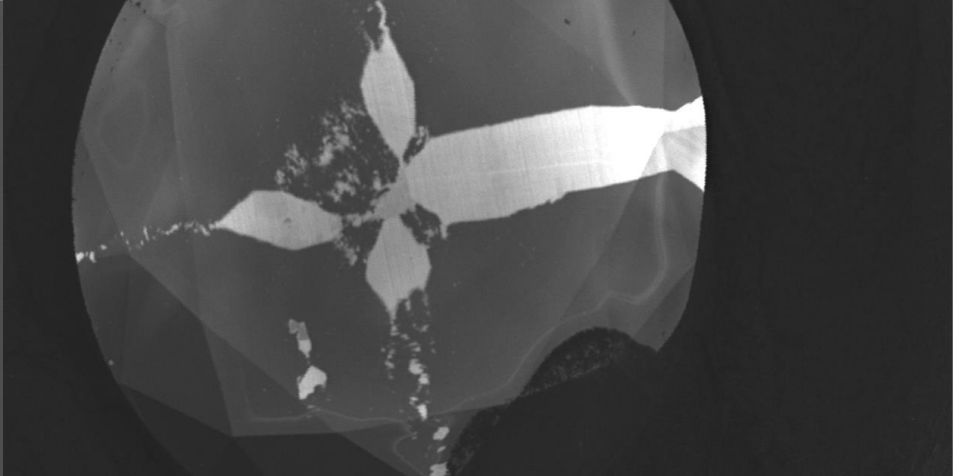
20kV

100µm

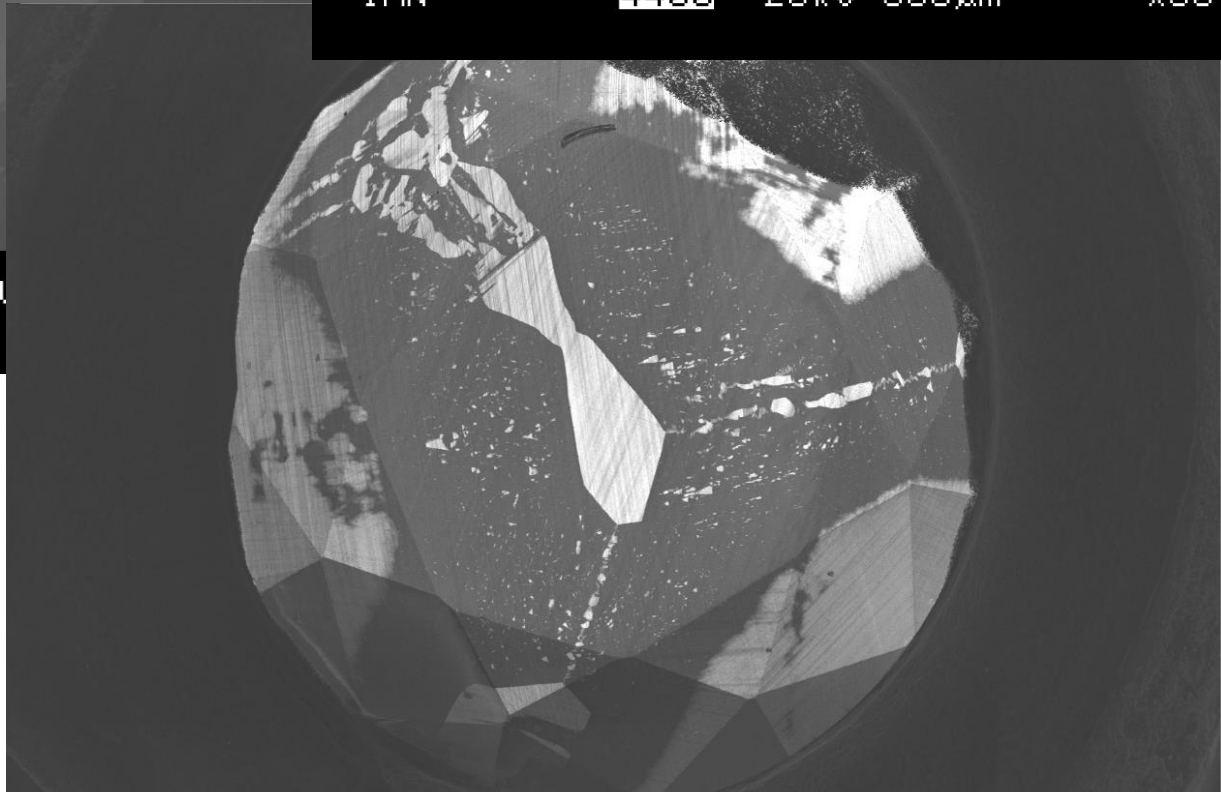
x120



IMN 4423 20kU



IMN 4400 20kU 500µm x30

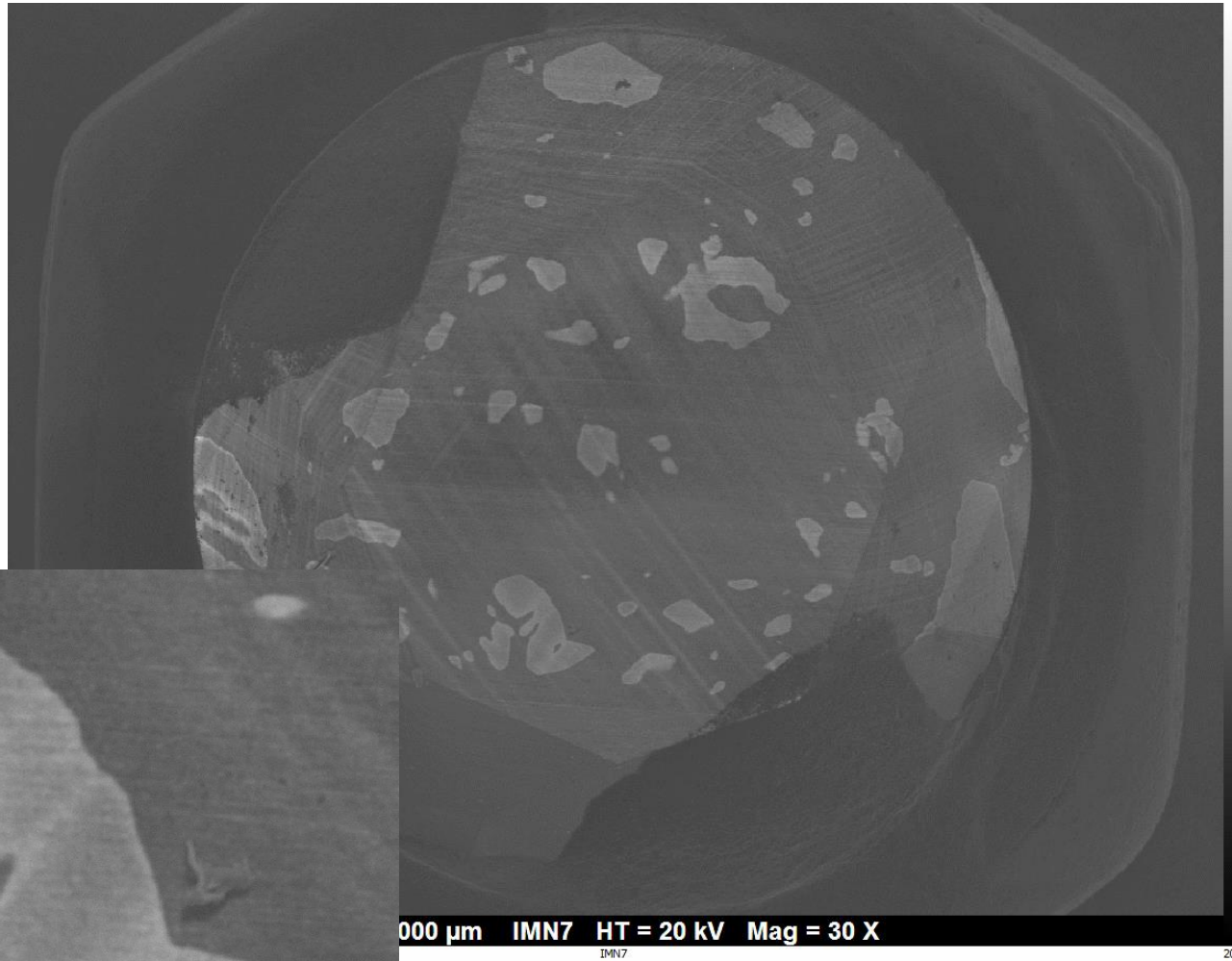


IMN 4417 20kU 500µm x27

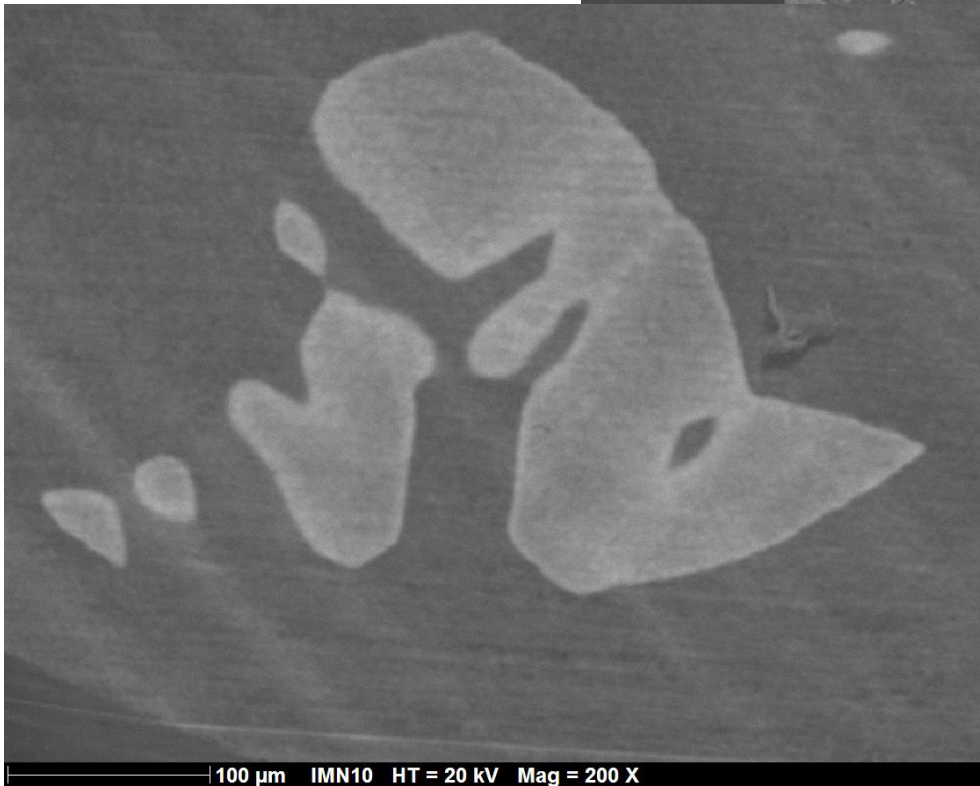
Des (petites) faces  
du cube

TH 2-339 Olive

Intercroissance  
poecilitique



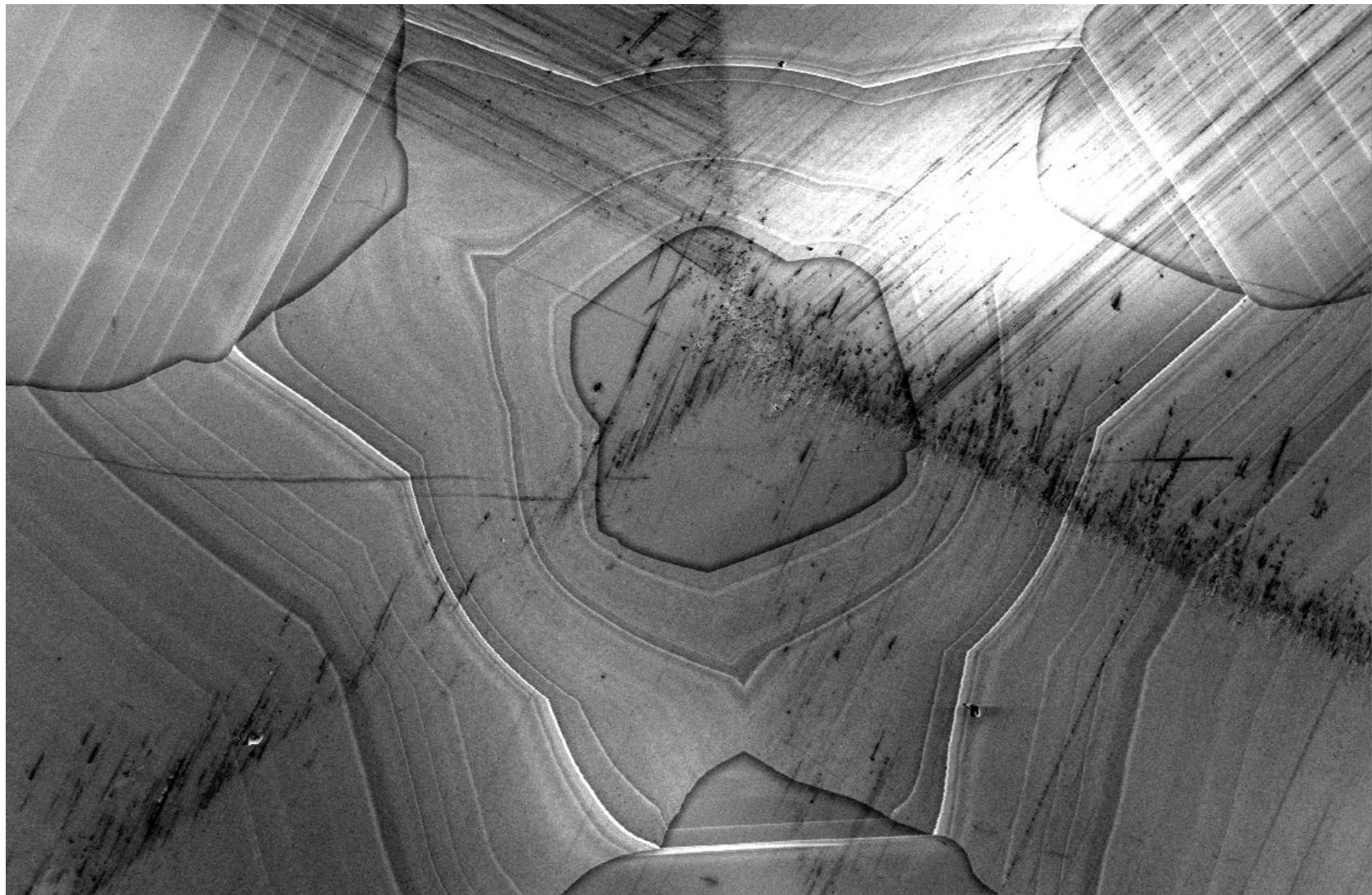
202



IMN10

The image features a classic hypnotic pattern of concentric circles. The outermost ring is black, followed by a red ring, then a black ring, and a red ring. At the center is a solid black circle. Overlaid on this pattern is the text "That's all Folks!" in a white, elegant cursive font. The text is positioned diagonally across the center, starting from the left side and ending on the right side, with the exclamation point at the far right. The white text stands out sharply against the dark background of the central circle and the surrounding rings.

*That's all Folks!*



595

0052

15kV 500µm

x50







