

dapnia

cea

saclay



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February 21st - 2007

Standard « In-Situ » Baking

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not appropriated to

Cavity Mass Production



Baking Duration (2 days)

too long → *time decrease*

Ultra High Vacuum Requirements

cavity preparation - risk of leaks

→ *open ended cavity (after HPR in clean room)*

« Fast » Baking (UHV)

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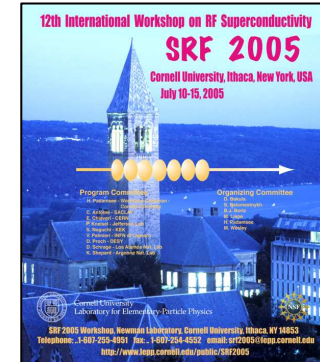
saclay

- Cavity pumped out (Ultra High Vacuum)
- Infra-Red emitters (T rise time : few mn)

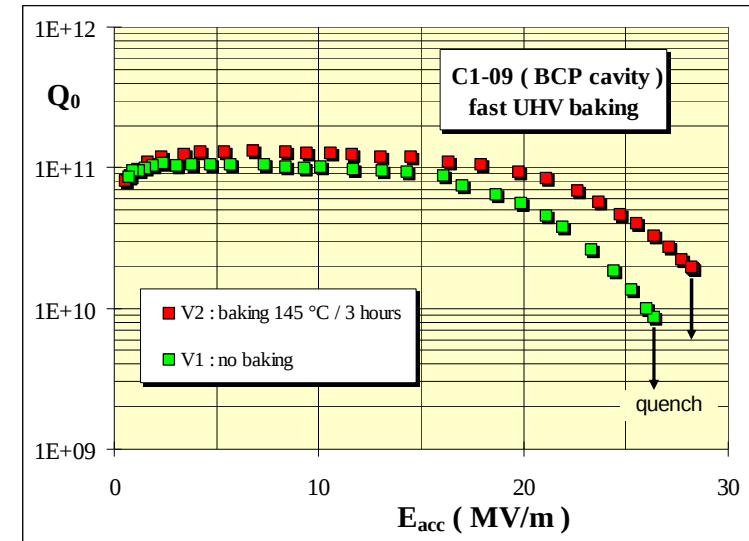


145 °C - 3 hours
(UHV)

Standard
Chemistry
BCP (1:1:2)



TuP05



« Fast » Baking (Air)

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- Cavity open ended
- IR emitters or Stove

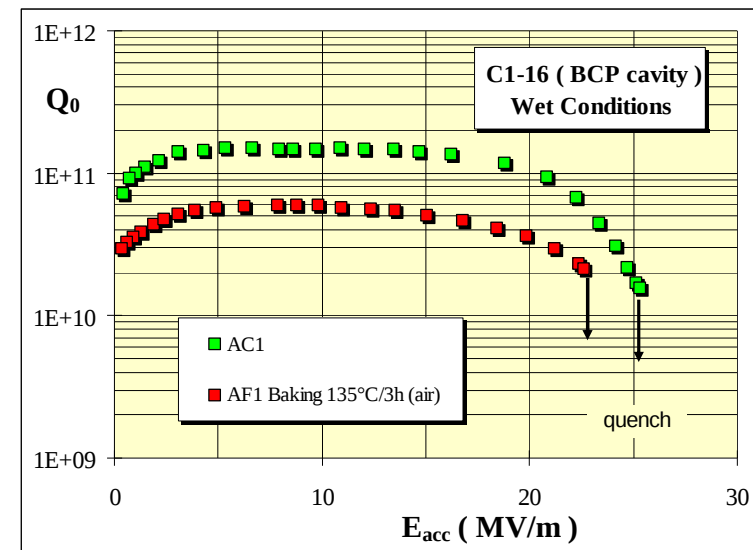


145 °C - 3 hours
(air)

Standard
Chemistry
BCP (1:1:2)



TuP05



« Fast » Baking (Oxygen Free Atmosphere)

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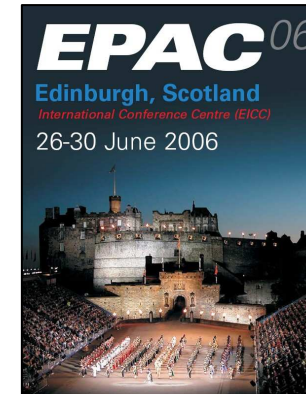
- Cavity open ended
- Stove (T rise time : ~ 1 h)
inert gas : Argon



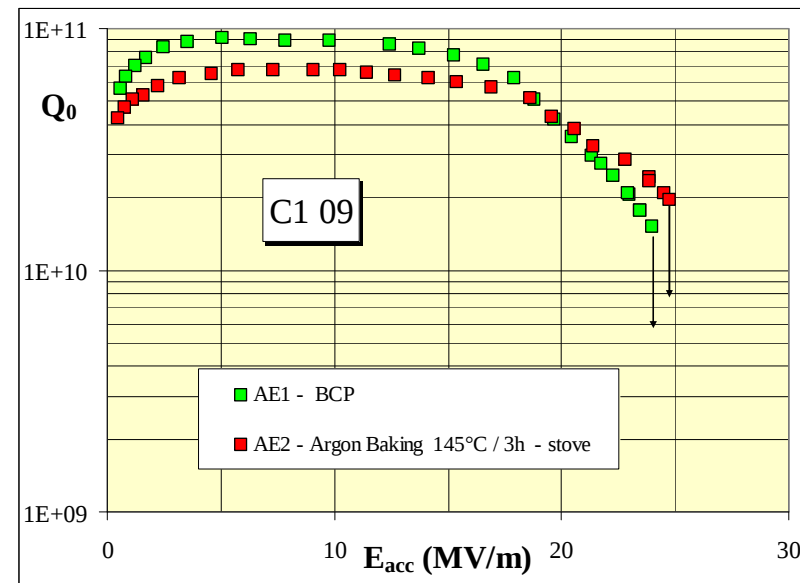
145 °C - 3 hours
(argon)

Standard
Chemistry
BCP (1:1:2)

Q-slope improvement exists :
it should be better with short T rise time
and more impressive on EP cavity



MOPCH141



« Fast » Baking (Argon)

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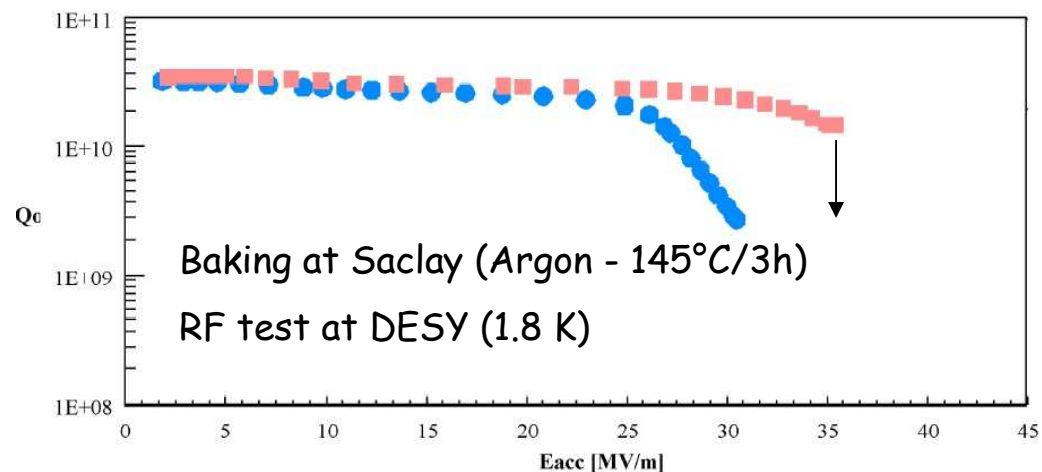
- Cavity closed with flanges
- Infra-Red emitters (T rise time : 5 mn)



145 °C - 3 hours
(Argon)

1DE14
Electropolished Cavity

FE & Quench @ 36 MV/m



« Standard » and « Fast Argon » Baking

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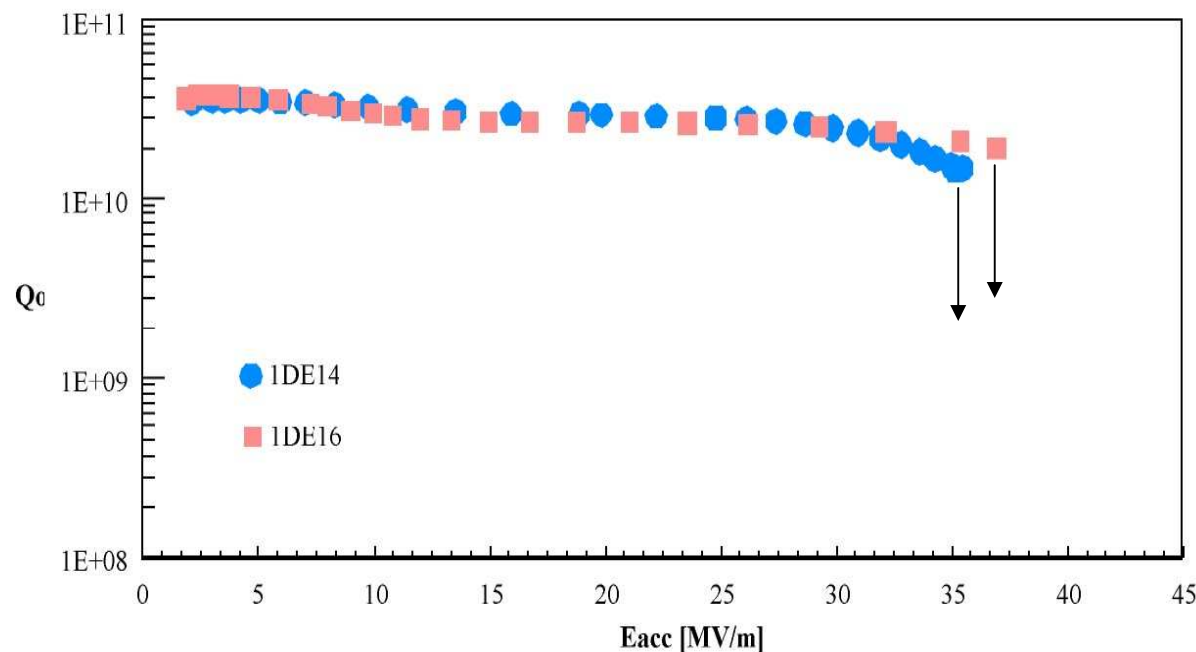
saclay

Similar DESY Cavities
Fine Grain - Heraeus Nb - RRR 300
800°C - Henkel EP (100 μm)



RF tests at DESY (1.8 K)

Similar results after baking



1DE14

Baking at Saclay
(Argon - 145 °C / 3 h)

1DE16

Baking at DESY
(UHV - 130 °C / 48 h)

Conclusion : General Rules for Baking

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Oxygen Free Atmosphere

UHV or Argon

values for T/t parameters
(upper limits)

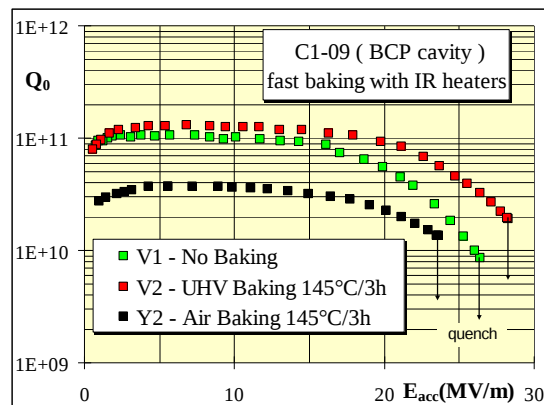
Standard :

110 - 120°C/60h or 120 - 130°C/48h
120°C/12h (LG or SC cavities)

Fast : 145 °C / 3h

Avoid Oxygen diffusion in Nb

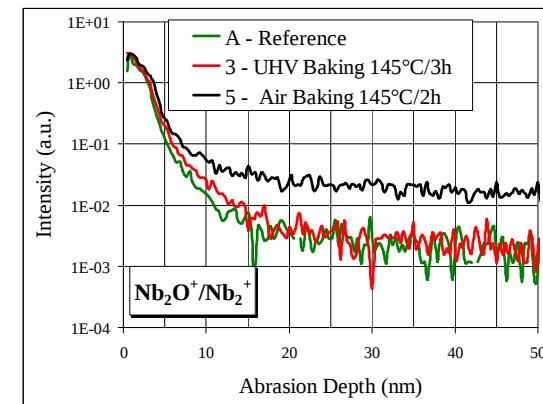
from surface and Nb₂O₅/Nb interface



RF tests on Nb cavity



strong correlation



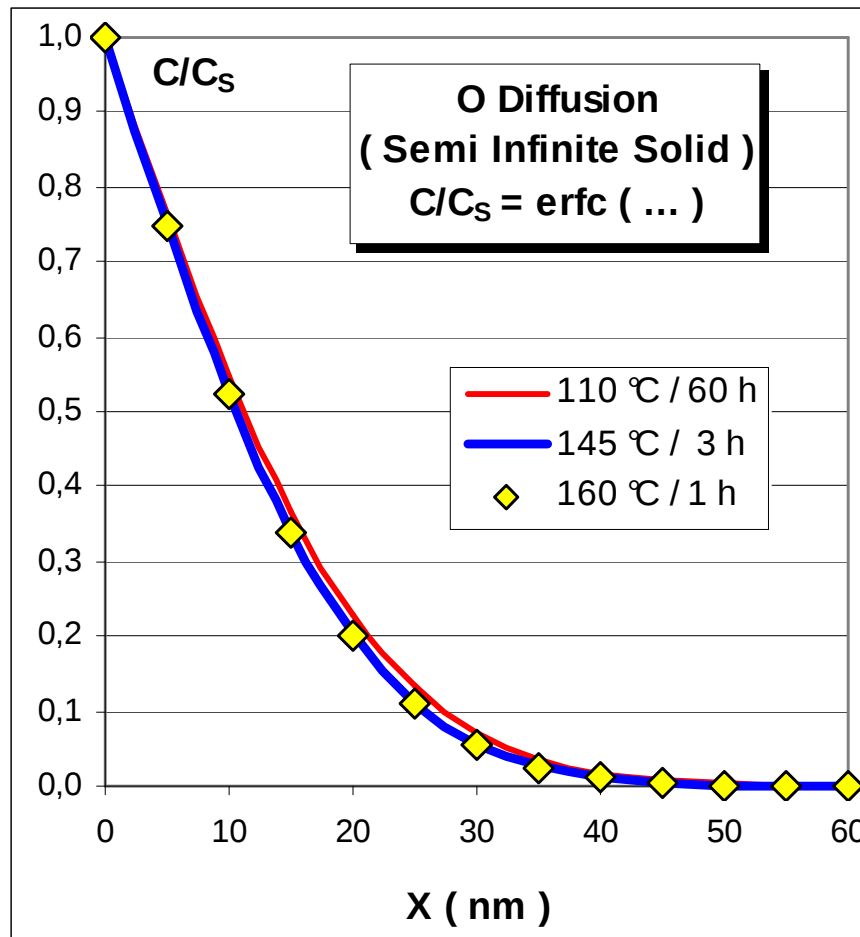
SIMS analyses on Nb samples

Next Step ... « 1 hour » Baking ?

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Limit before
noticeable O diffusion

110°C / 60h

↔

145°C / 3h

↔

160°C / 1h

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***Thanks to
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