

# Preliminary results of wire-breaking MD

(M. Sapinski, WS meeting 2009.02.17)

MD took place on October 23rd, 2008  
participants: Ana, Barbara, Jan, Elias and Mariusz  
wire removal after MD: Michel Sillanoli  
photos: Gudrun Jesse (EN/MME)

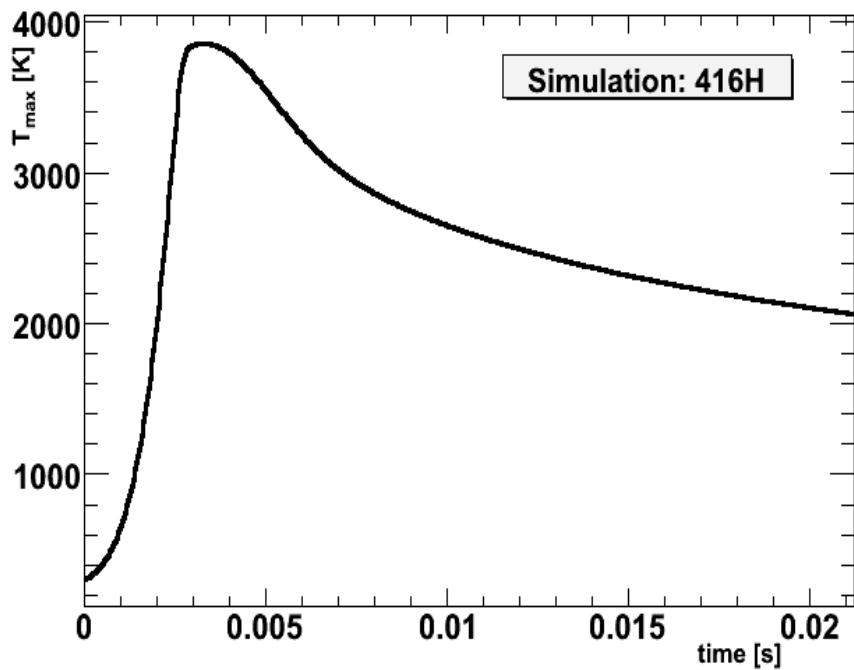
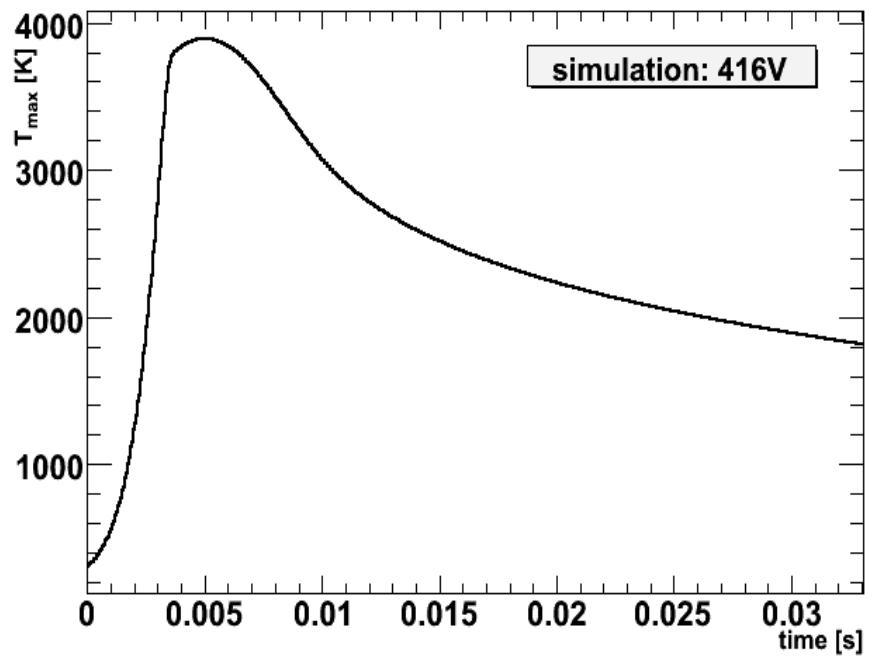
## Breakage of 416V: beam conditions

- Time: 15:54
- Beam intensity (from BCTDC):  $2.41 \cdot 10^{13}$  protons
- $V = 0.5$  m/s but  $v_{\text{eff}} = 0.4$  m/s (scanner is rotational)
- Beam size along the scan direction:  
 $\sigma_{\text{long}} = 0.66$  mm  
(read from the same scanner but some cycles before)
- Beam size transverse to scan direction:  
 $\sigma_{\text{transv}} = 0.56$  mm  
(read from 416H, later)
- Scans: 6, 4, 3, 2, 1.5, 1, 0.8, 0.7, 0.6 m/s (every 3x)

## Breakage of 416H: beam conditions

- Time: 17:20
- Beam intensity (from BCTDC):  $2.18 \cdot 10^{13}$  protons
- $V = 0.6 - 0.7$  m/s,  $v_{\text{eff}} = 0.5$  m/s
- $\sigma_{\text{long}} = 0.53$  mm  
(read from the same scanner but some cycles before)
- $\sigma_{\text{transv}} = 0.725$  mm  
(read from 416V before - it broke 3 hours earlier)
- Scans with: 6, 3, 1, 0.8, 0.7, 0.6 m/s (3x each)

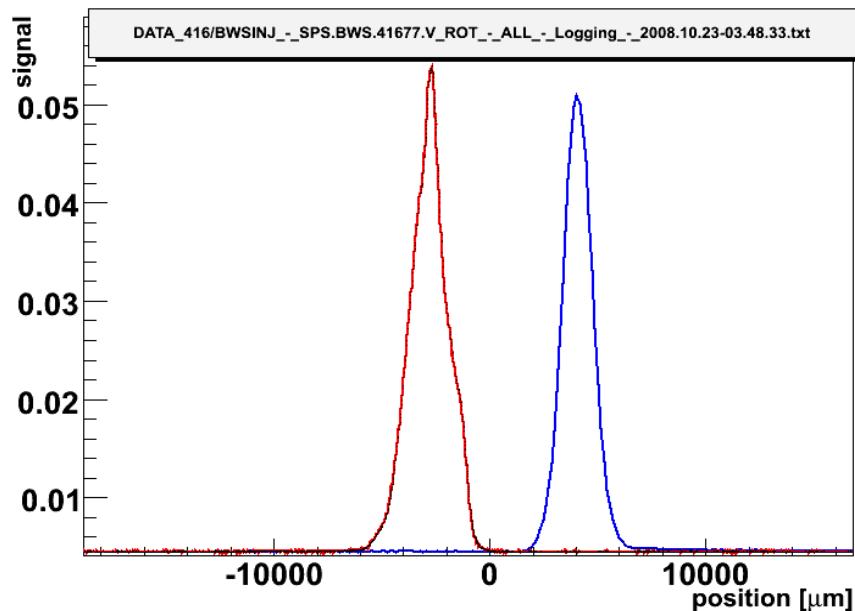
# Simulation: maximum temperature



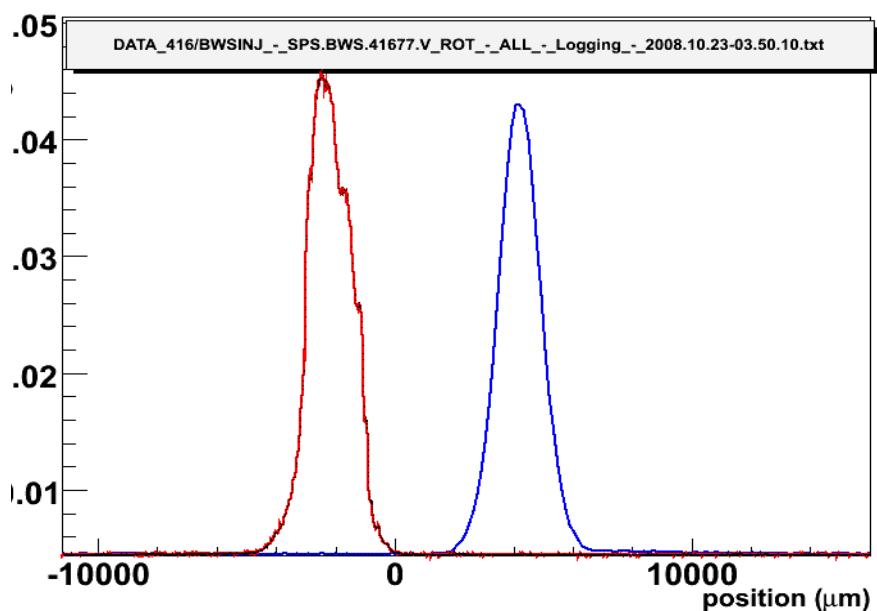
The maximum temperature (in the beam center) profiles looks very similar what shows how well the beam conditions are reproduced and that the wire breakage was in both cases similar.

# Breakage of 416V: data

Before last



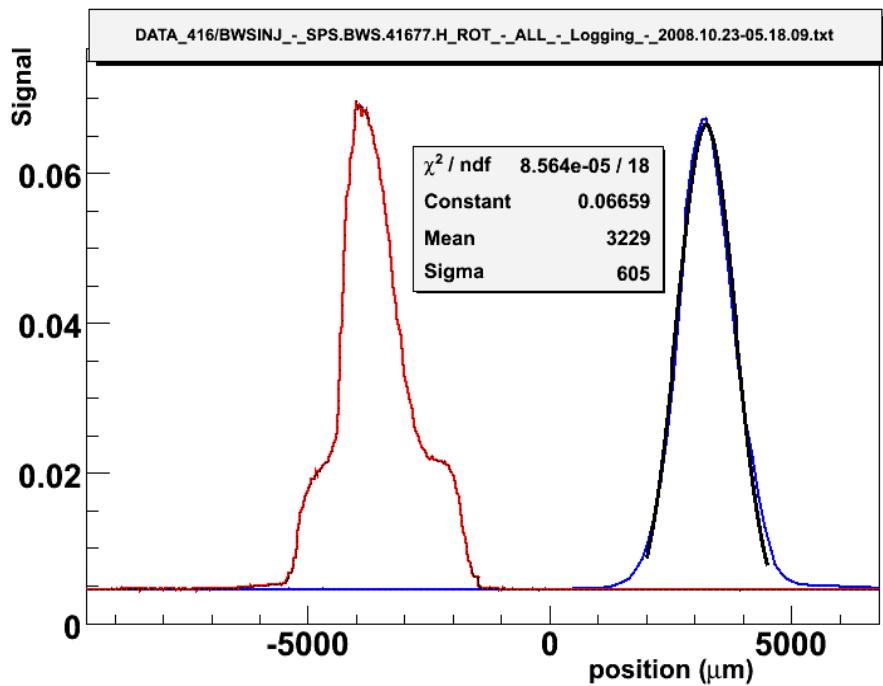
last



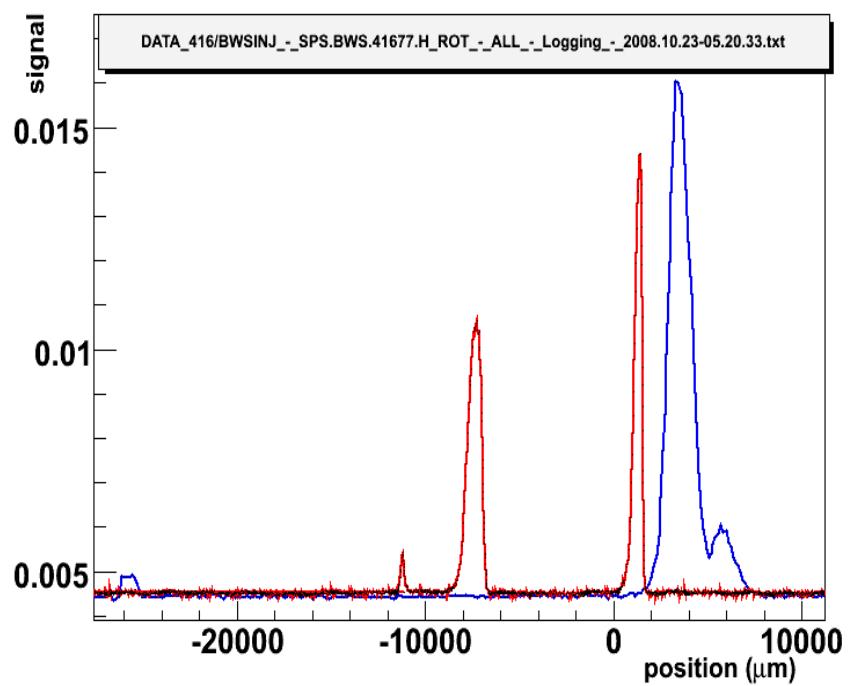
Observation: OUT scan looks different than IN – the wire had no time to cool down? Setting between IN and OUT was 400 (ms?).

# Breakage of 416H: data

Before last

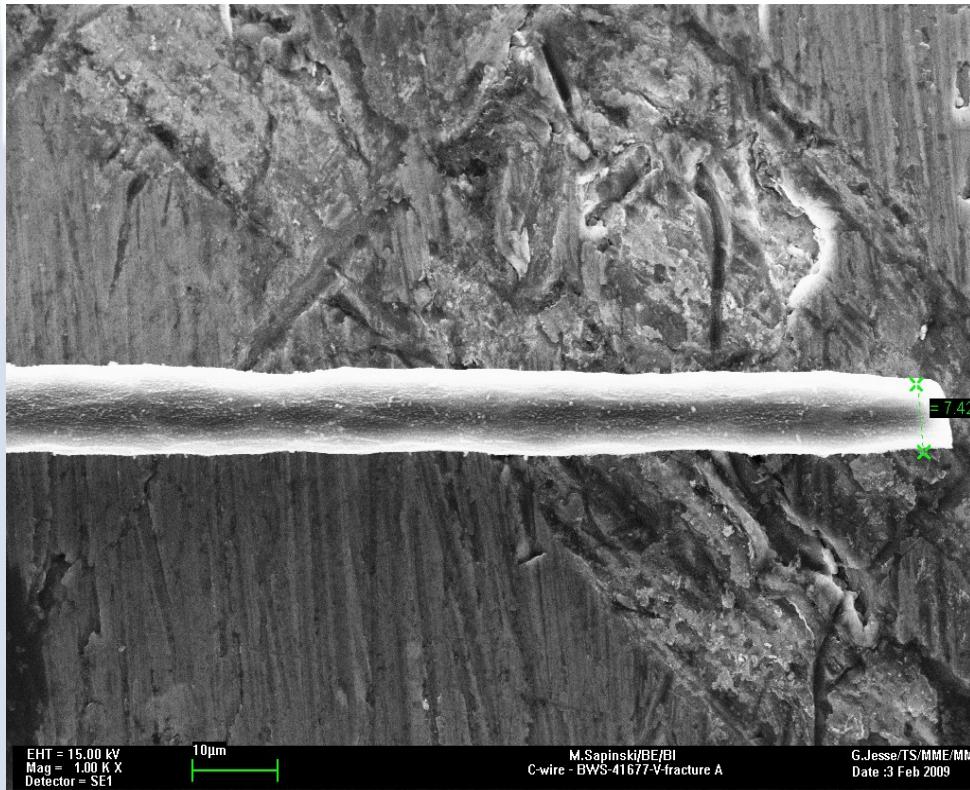


last

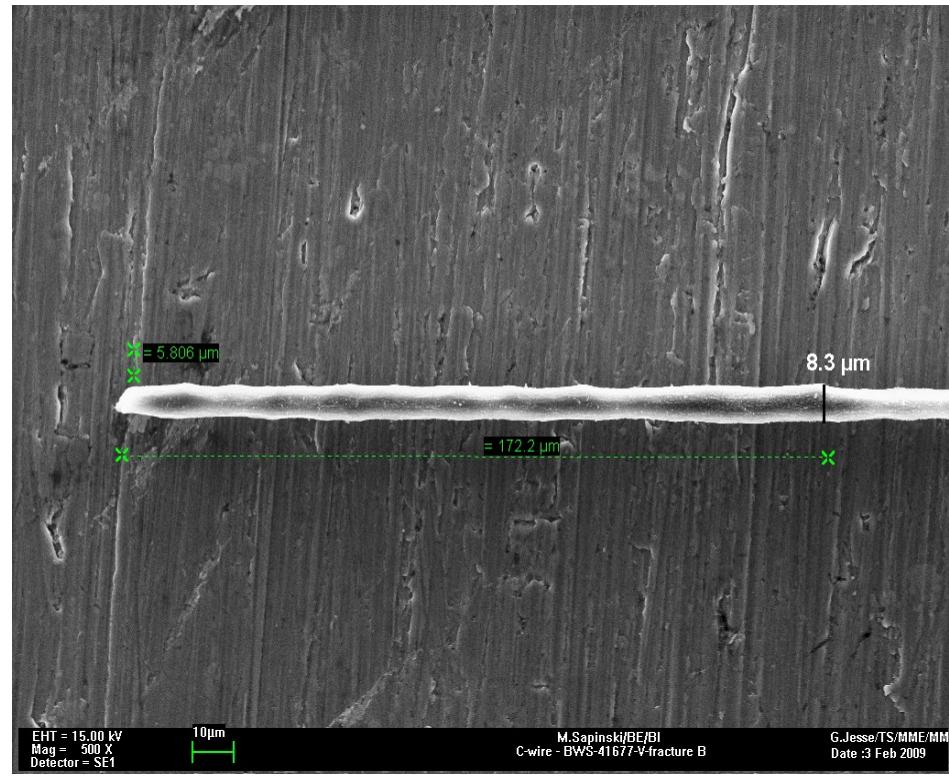


Observation: the last OUT scan shows huge vibrations or wire breakage along the wire (multiple pass of the beam)

# Breakage of 416V: post-mortem (1)

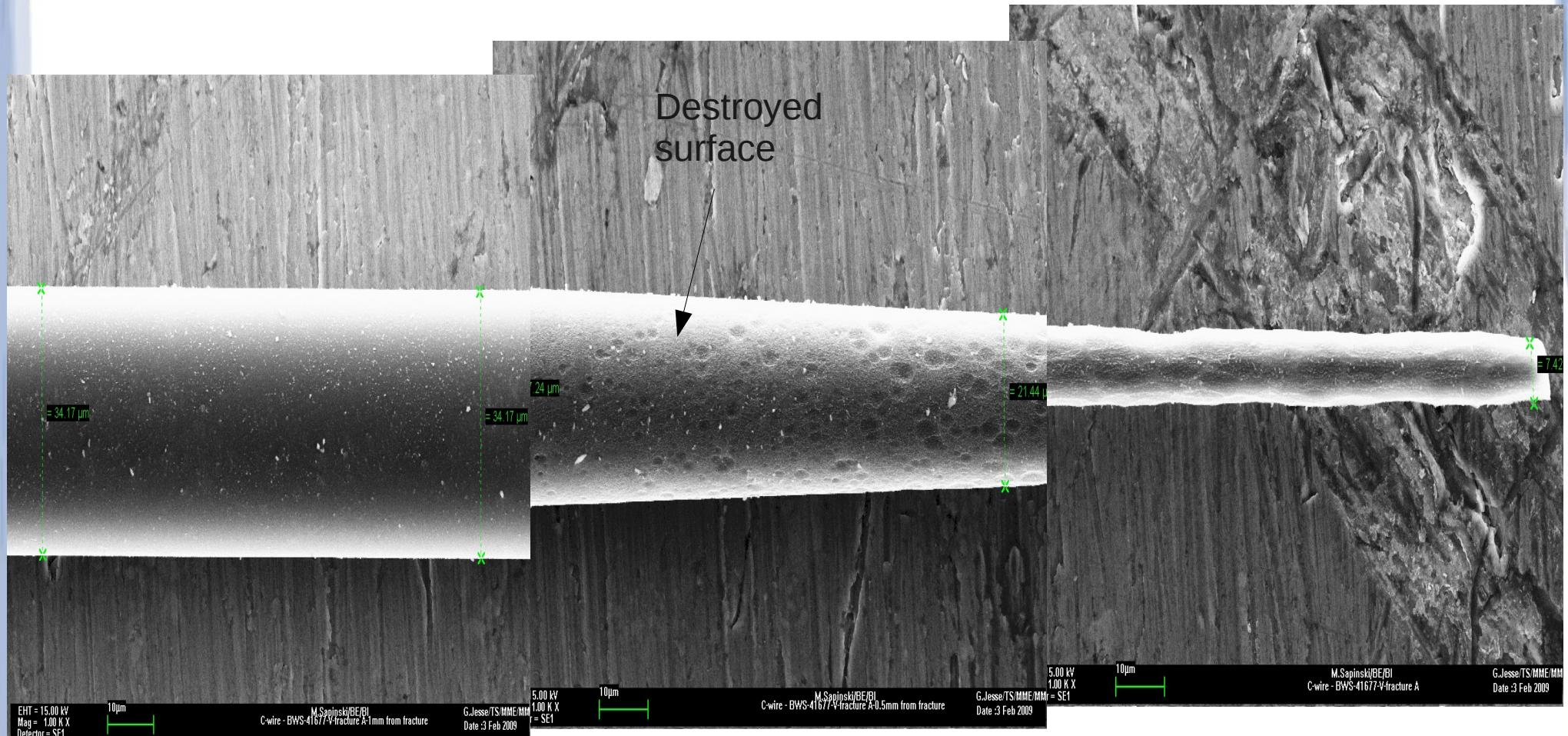


side A



side B

# Breakage of 416V: post-mortem (2)

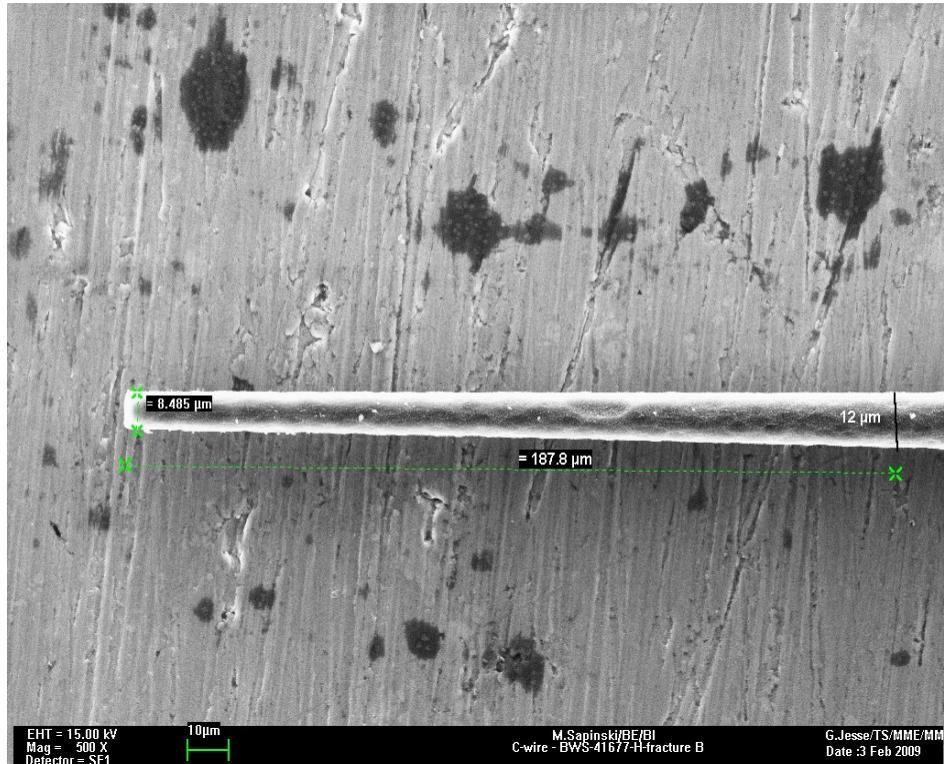
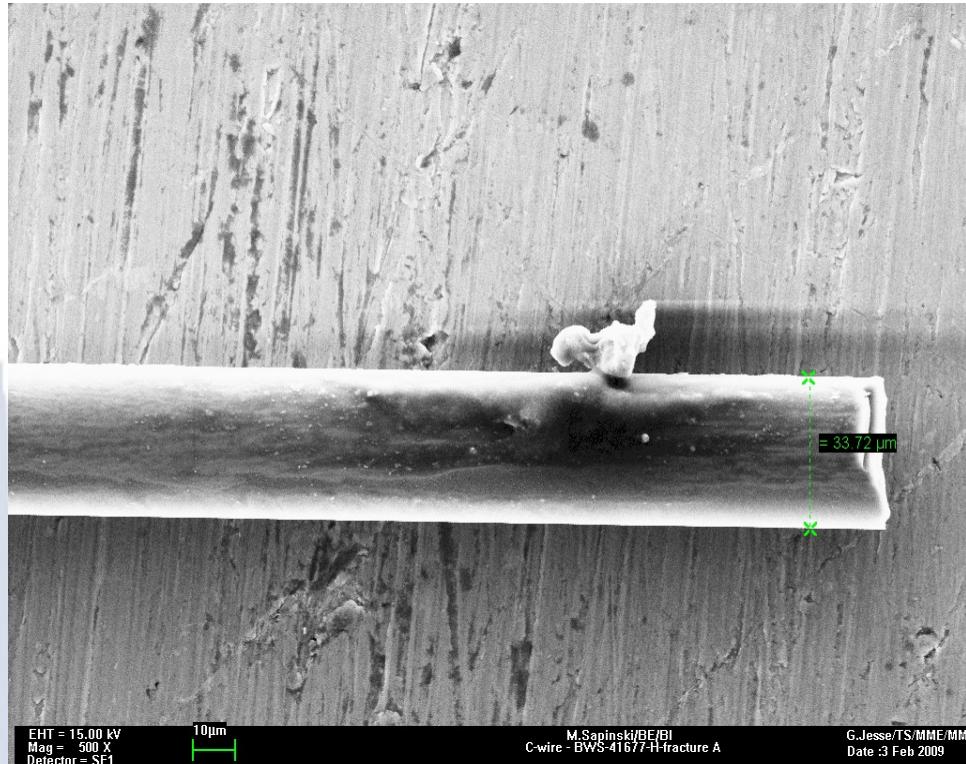


1 mm

0.5 mm  
(distances from the beam center)

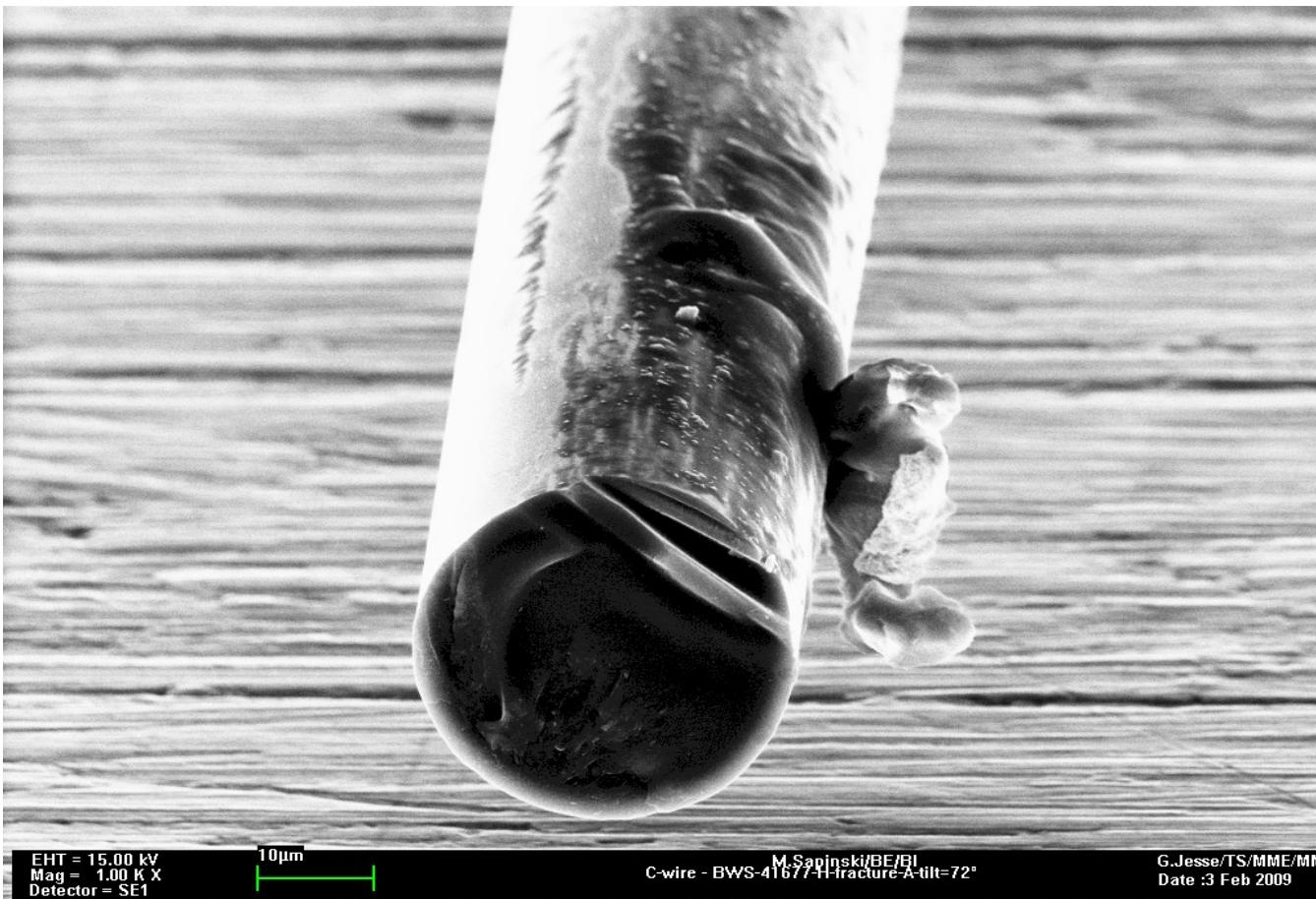
0.0 mm

# Breakage of 416H: post-mortem (1)



Typical for mechanical breakage

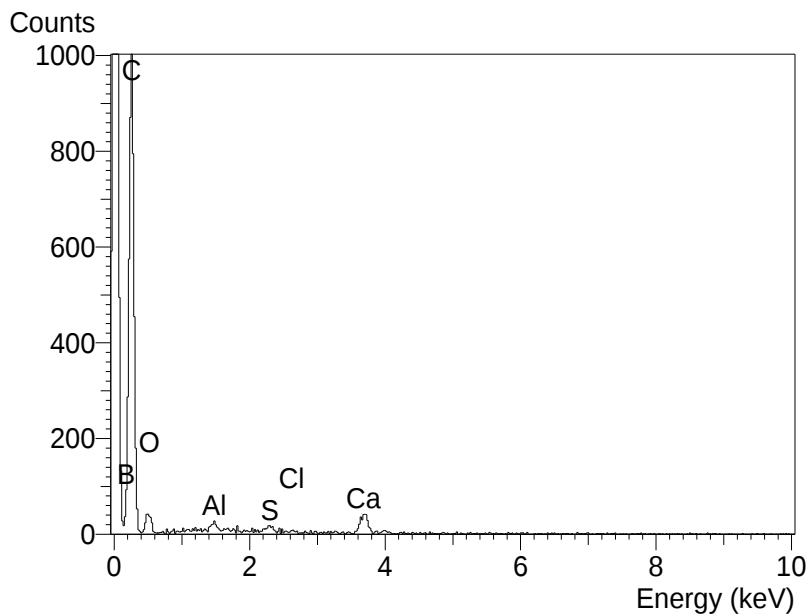
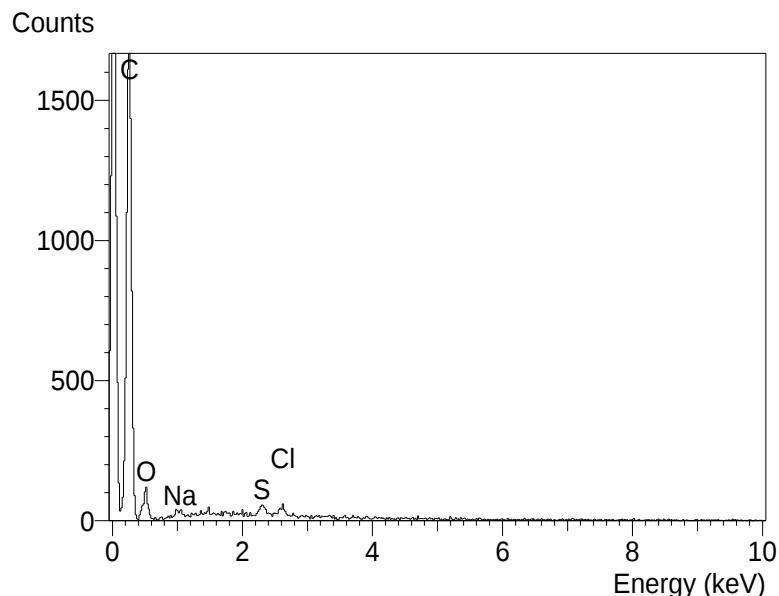
# Breakage of 416H: post-mortem (2)



The strange micromonster from close...

# Spectral analysis

- Not very conclusive – we know too little about what to expect
- Chlorine (rather not from paper, maybe from technological process)
- Sulfur in the “micromonster”
- Some aluminium, probably not from the support
- Calcium – typically from dust



# To do

- Intercalibration studies
- Debunching studies
- Check simulations of thermionic emission, resistivity and sublimation
- What about 414 V? We went down with speed to 0.7 m/s, maybe the wire is almost broken?