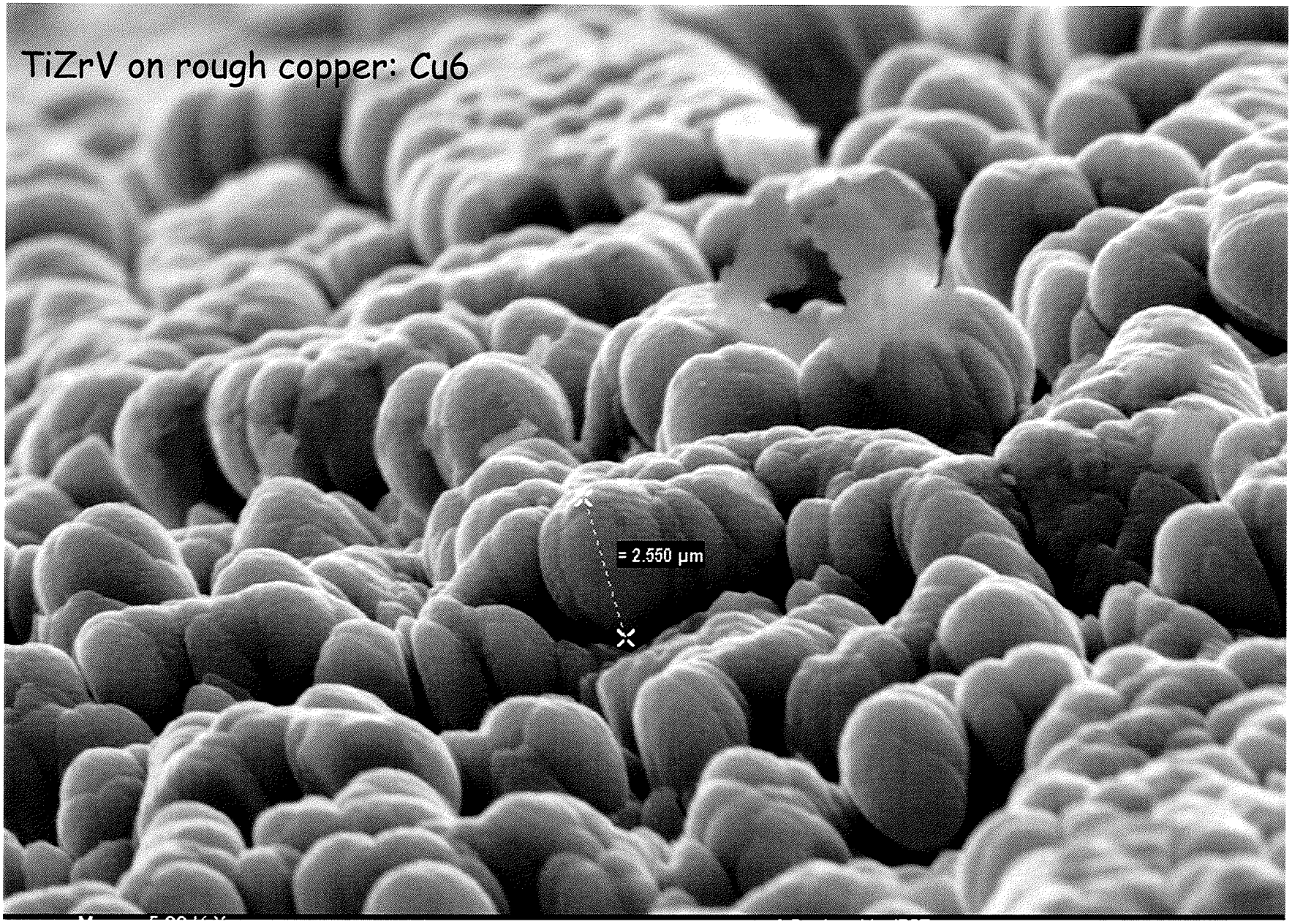
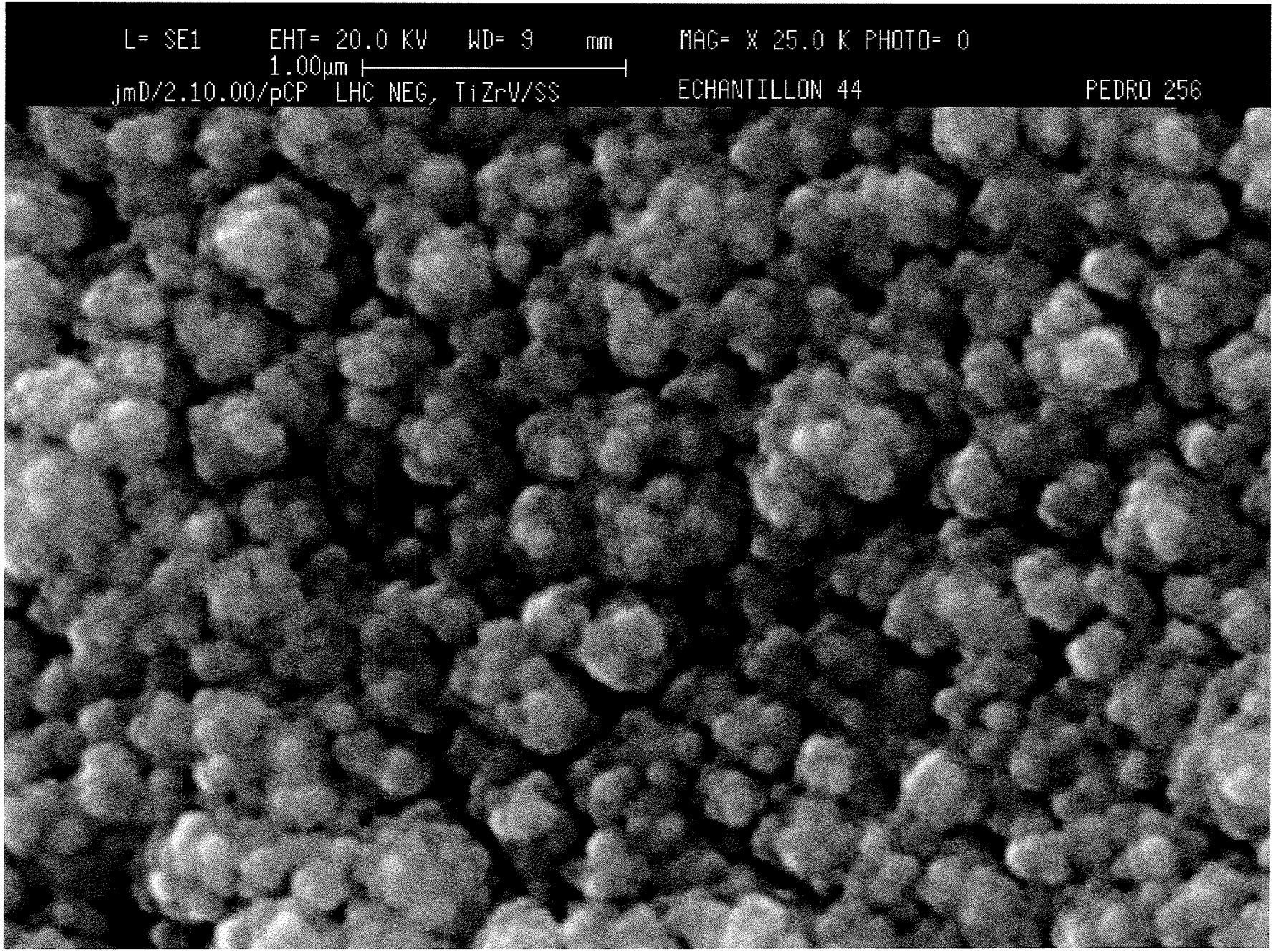
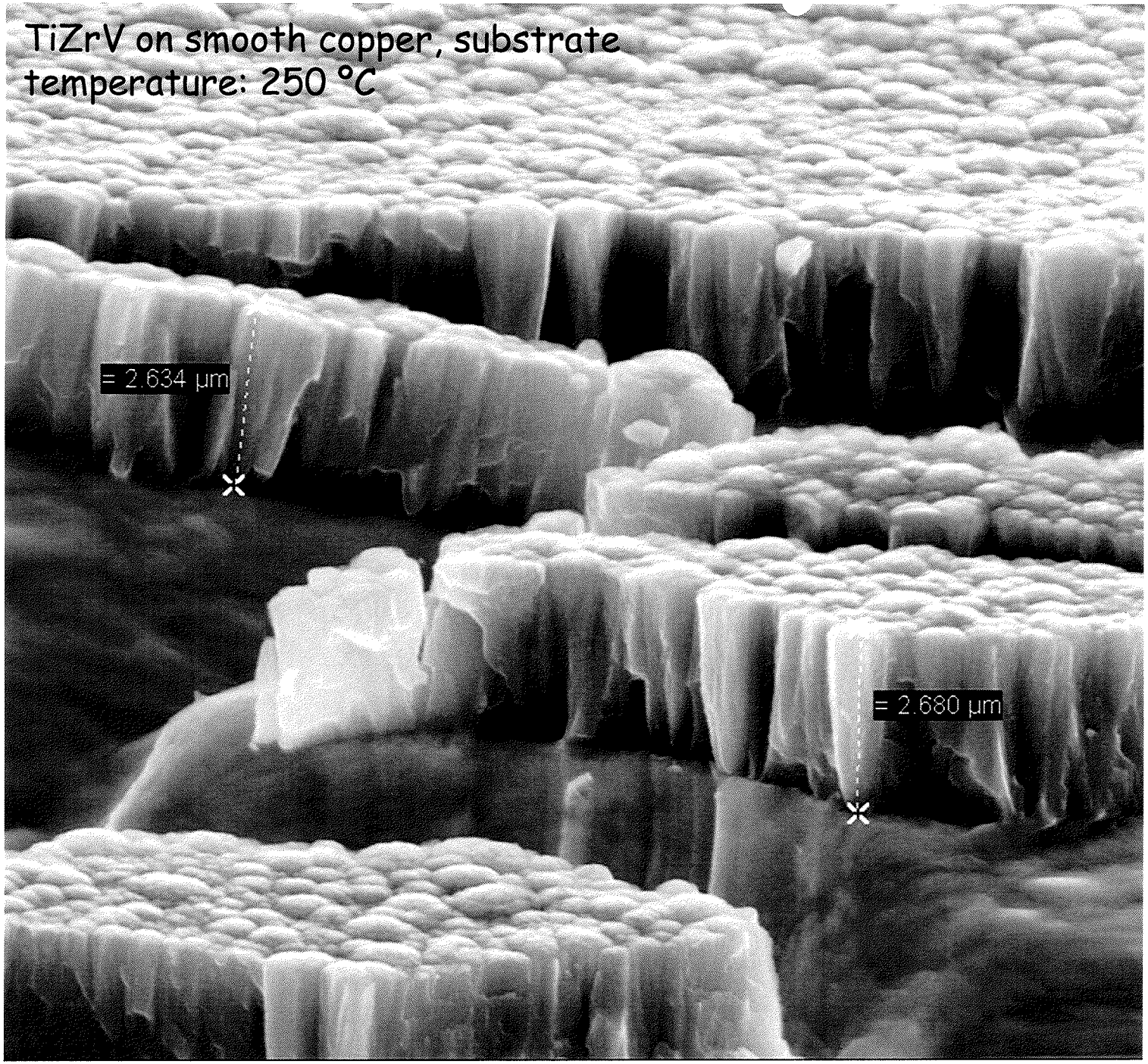

TiZrV on rough copper: Cu6
= 2.550 µm


L= SE1 EHT= 20.0 KV WD= 9 mm MAG= X 25.0 K PHOTO= 0
1.00µm
jmD/2.10.00/pCP LHC NEG, TiZrV/SS ECHANTILLON 44 PEDRO 256


TiZrV on smooth copper, substrate temperature: 250 °C
= 2.634 µm
= 2.680 µm

✓ **Role of the substrate material on the activation process and on the film morphology.**

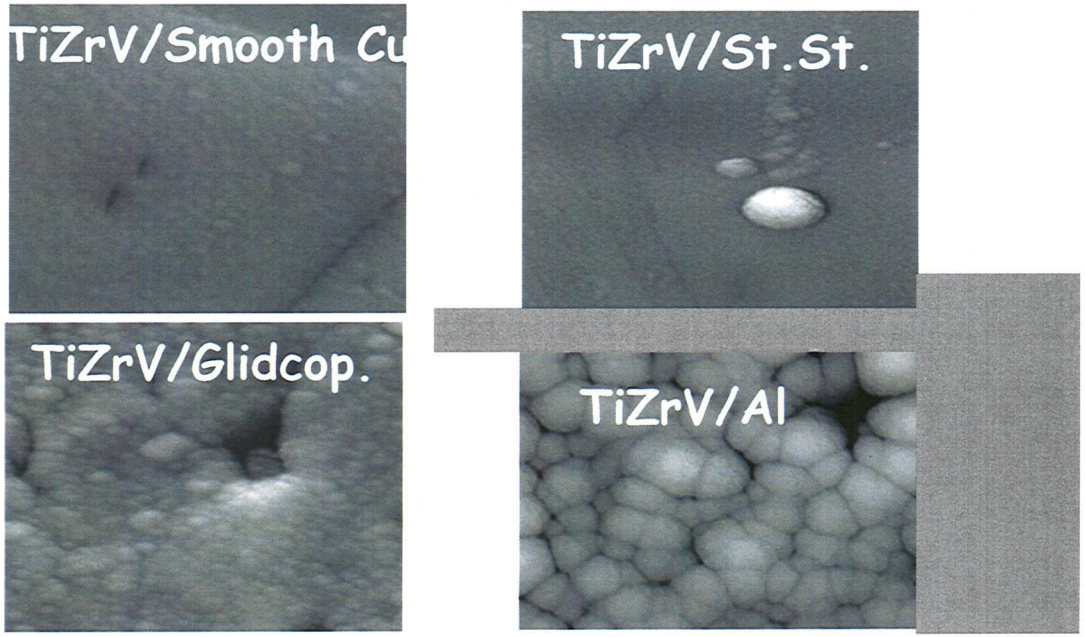
Does not affect the film crystallinity

Does not affect the activation process

Affects the film morphology

Substrates studied

Glass
Stainless steel
Copper
Aluminium
Glidcop
Beryllium
Al-Be

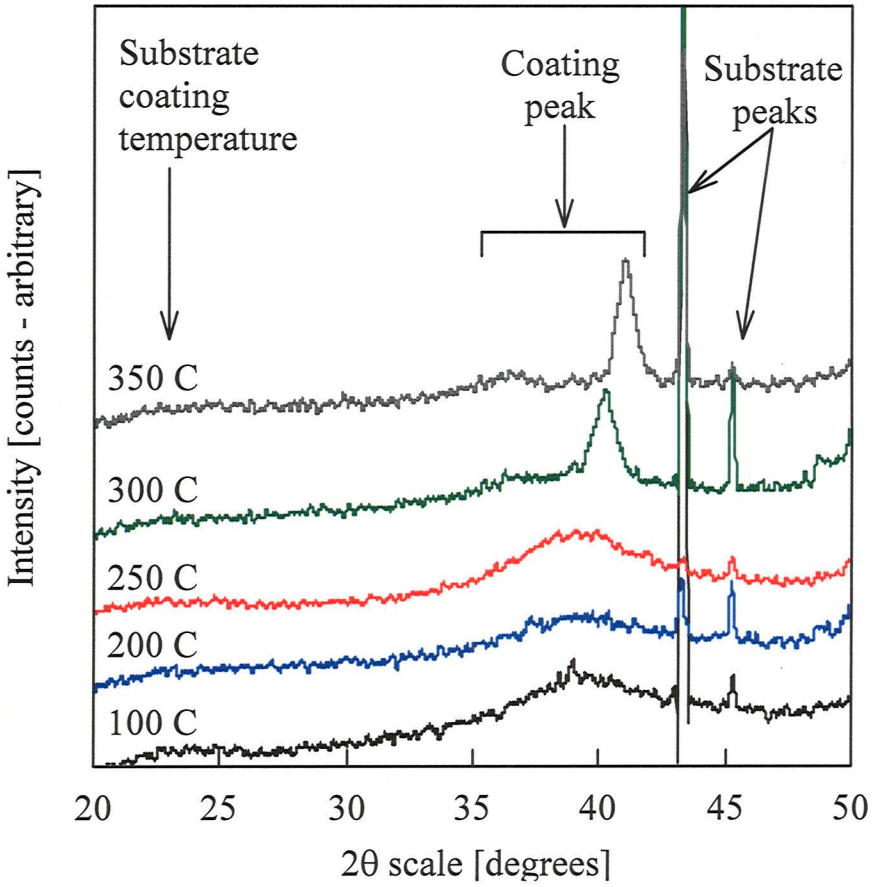


✓ Influence of the substrate temperature during coating.

Influence of the substrate temperature

On film crystallinity: increased grain size for T≥ 300°C

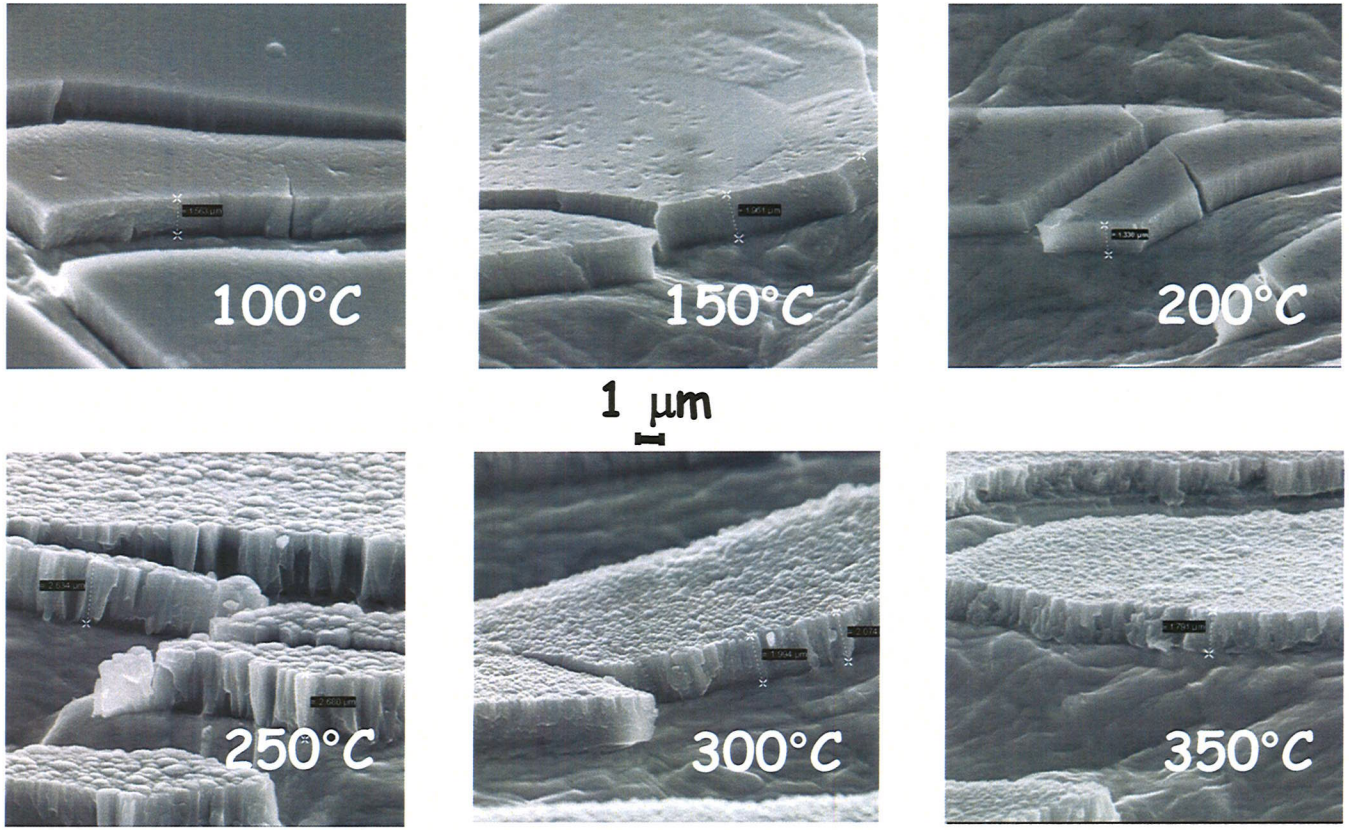
250 °C is the highest substrate temperature at which a grain size below the threshold value of 5 nm is still preserved.
For T>300°C the activation process is delayed



✓ Influence of the substrate temperature during coating.

Influence of the substrate temperature

On film morphology:
increased roughness for T> 200°C



✓ Functional properties:

Large and uniformly distributed pumping speed for most of the residual gases: ≈ 0.5 l $s^{-1}cm^{-2}$ for H_2 and ≈ 5 l $s^{-1}cm^{-2}$ for CO .

Monolayer surface capacity for CO (about 10^{15} molecules cm^{-2}).

Photon and electron desorption yields lower than those for standard vacuum materials.

Extremely low CH_4 and Kr outgassing rate: $\leq 10^{-17}$ Torr l $s^{-1}cm^{-2}$ (Kr desorption energy = 21±1 Kcal mol^{-1})

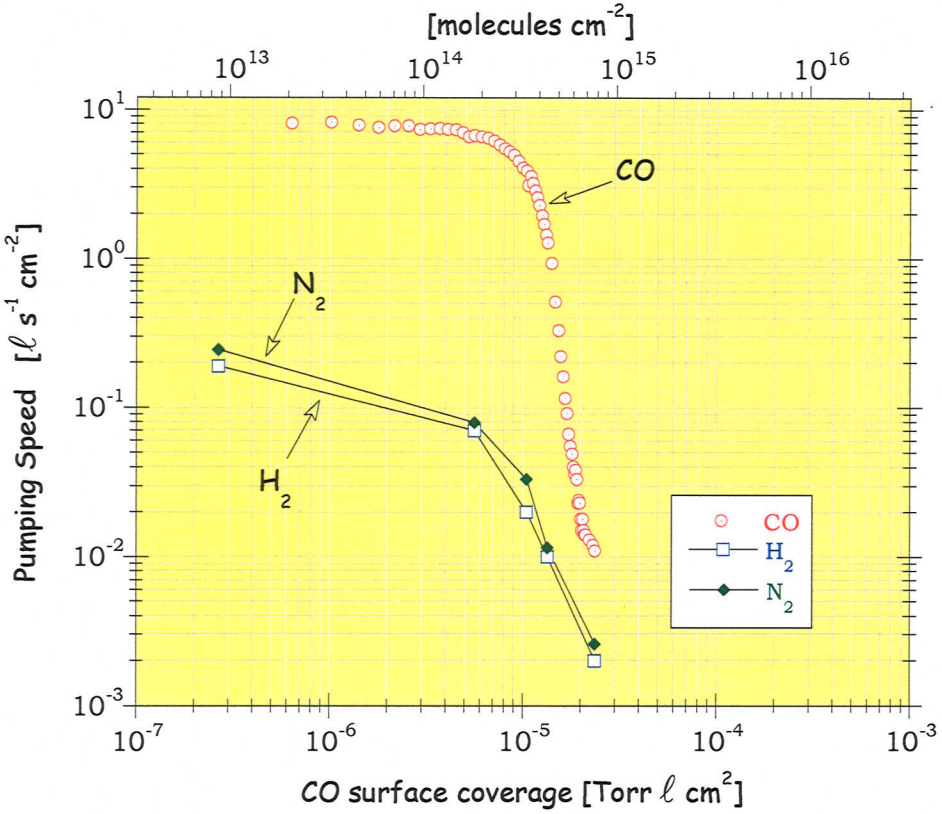
Typical initial H content of the order of 10^{-3} at. fraction. Dissociation pressure negligible at room temperature; 10^{-10} Torr at 180°C, 10^{-8} Torr at 250°C.

Safe H charging limit at room temperature: 10 Torr l g^{-1} ($\approx 2x10^{17}$ H_2 molecules cm^{-2} μm^{-1}).

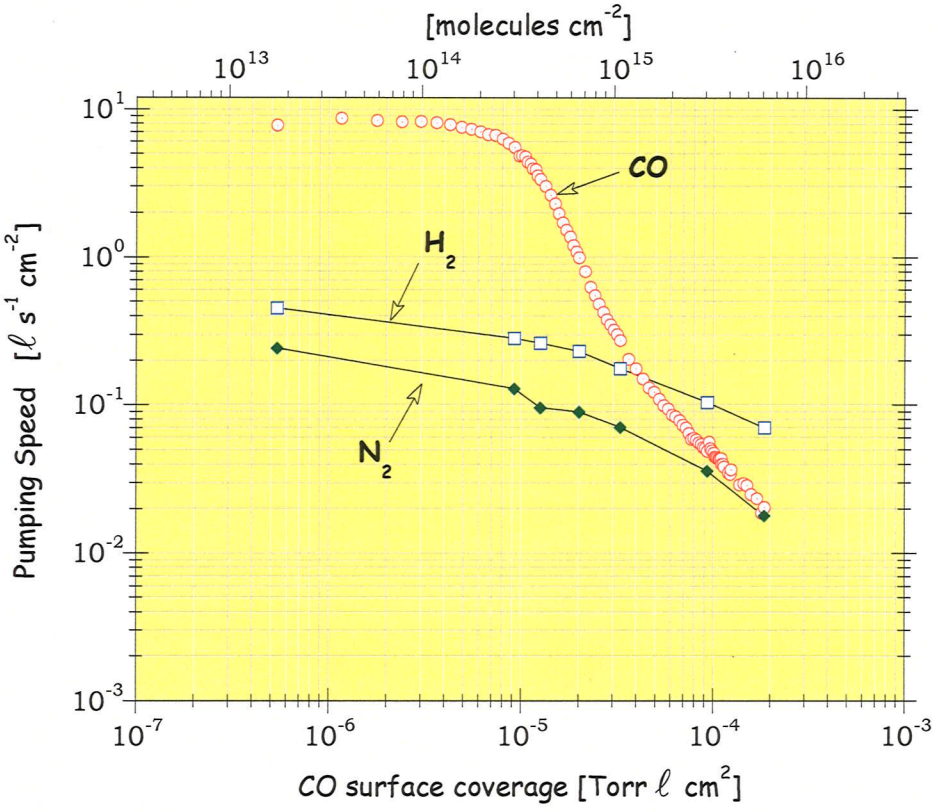
Low SEY ($\approx$1.1 at peak value)

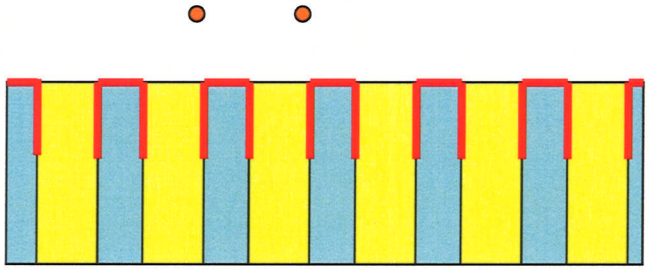
TiZrV functional properties: pumping speed

Smooth coating

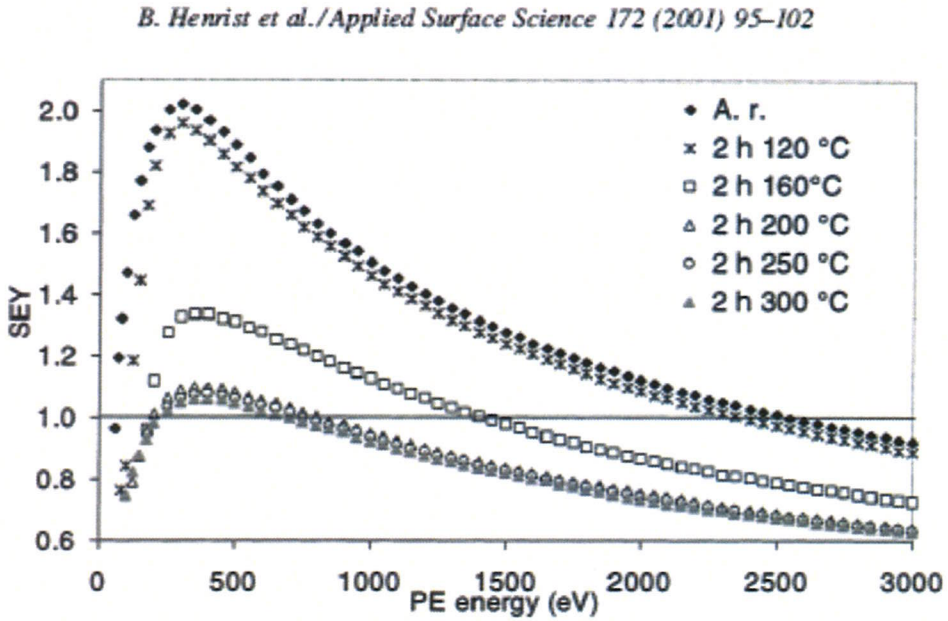


Rough coating

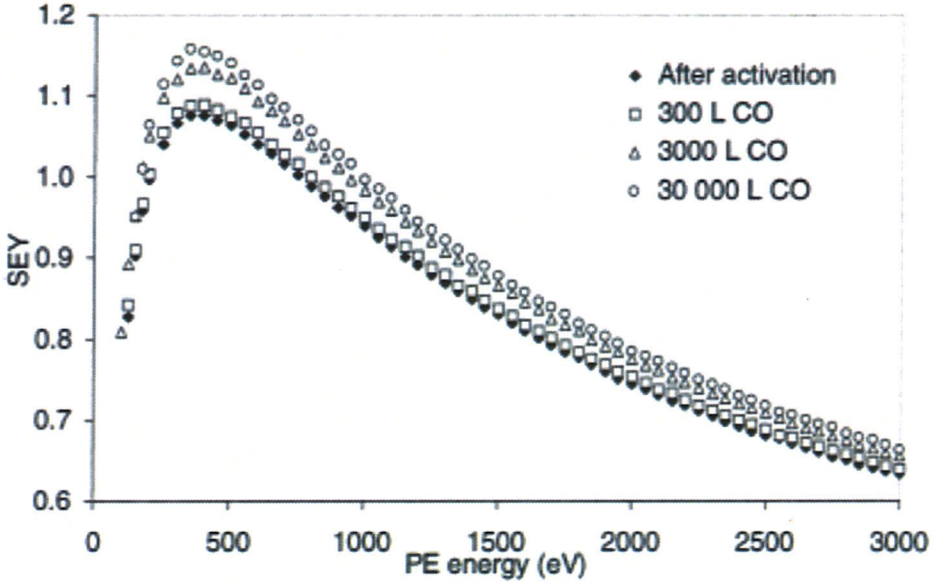




TiZrV functional properties: secondary electron yield



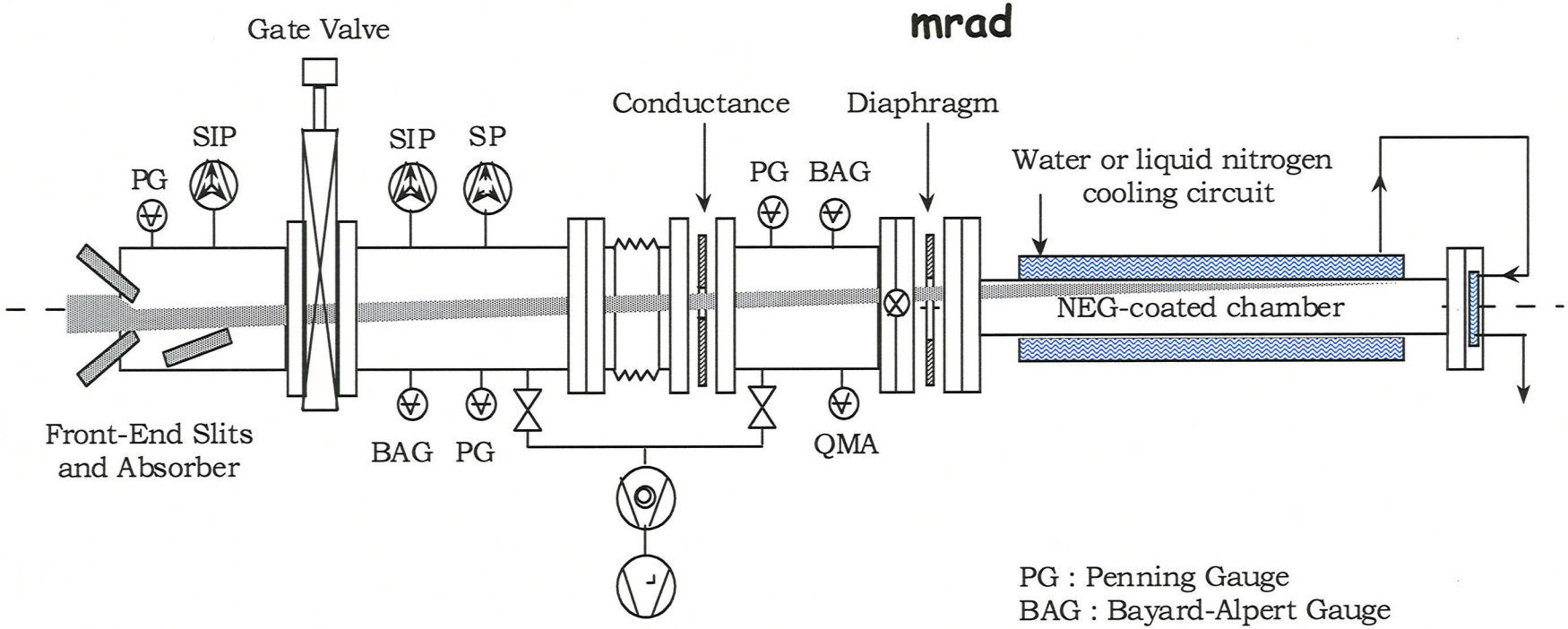
SEY versus PE energy of the TiZrV NEG coating:
as received and after 2h heating at 120, 160, 200, 250 and 300 °C.



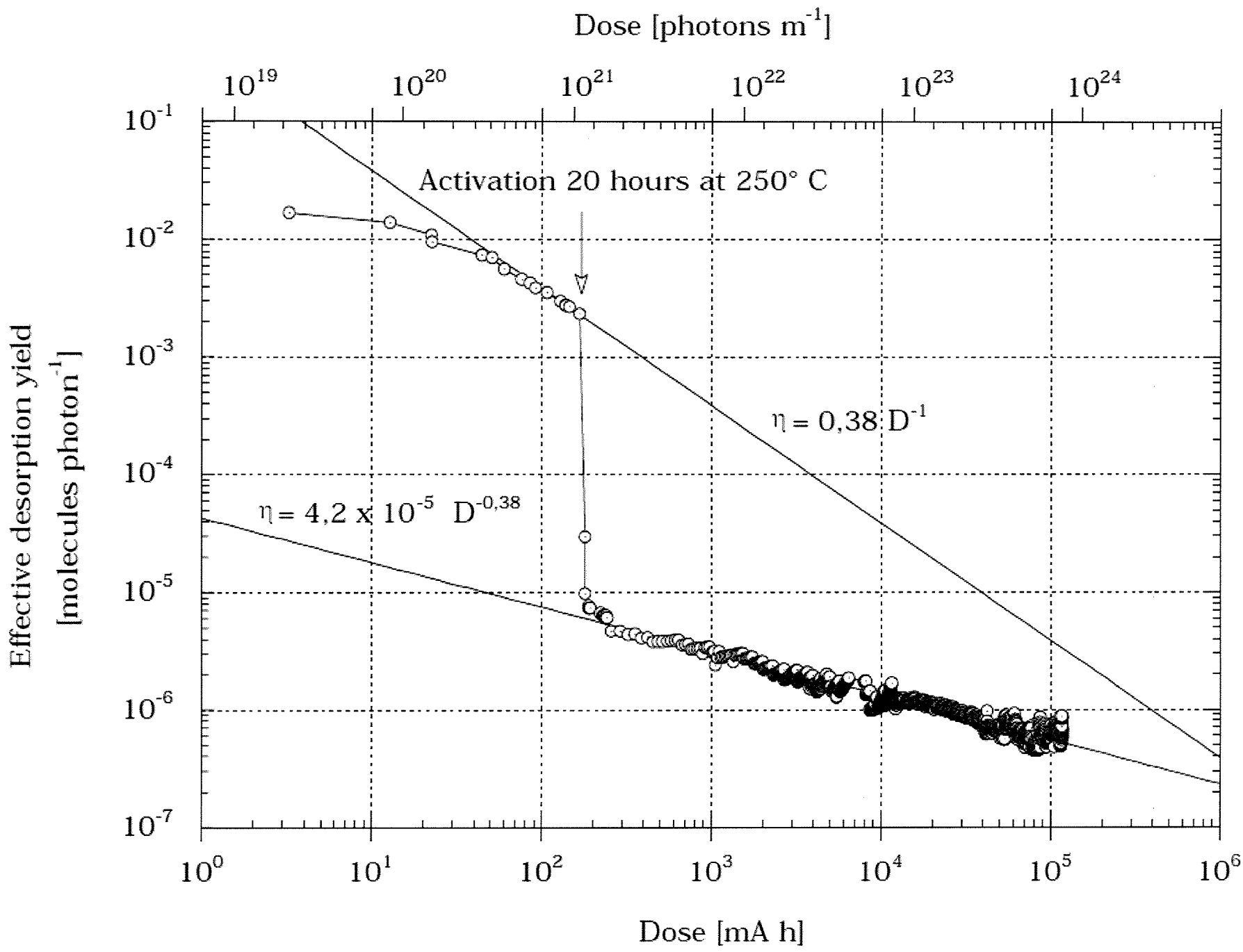
Influence of CO exposure on the SEY of a TiZrV coating activated 2 h at 300 °C and cooled at 60°C before CO exposure

TiZrV: synchrotron radiation induced desorption

Angle of incidence = 25 mrad



PG : Penning Gauge
BAG : Bayard-Alpert Gauge
QMA : Quadrupole Masss Analyser
SIP : Sputter Ion Pump
SP : Sublimation Pump


Dose [photons m^{-1}]
10^{19}
10^{20}
10^{21}
10^{22}
10^{23}
10^{24}
Activation 20 hours at 250° C
$\eta = 0{,}38\ D^{-1}$
$\eta = 4{,}2 \times 10^{-5}\ D^{-0{,}38}$
Effective desorption yield
[molecules photon^{-1}]
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
Dose [mA h]

✓ Performances deterioration: