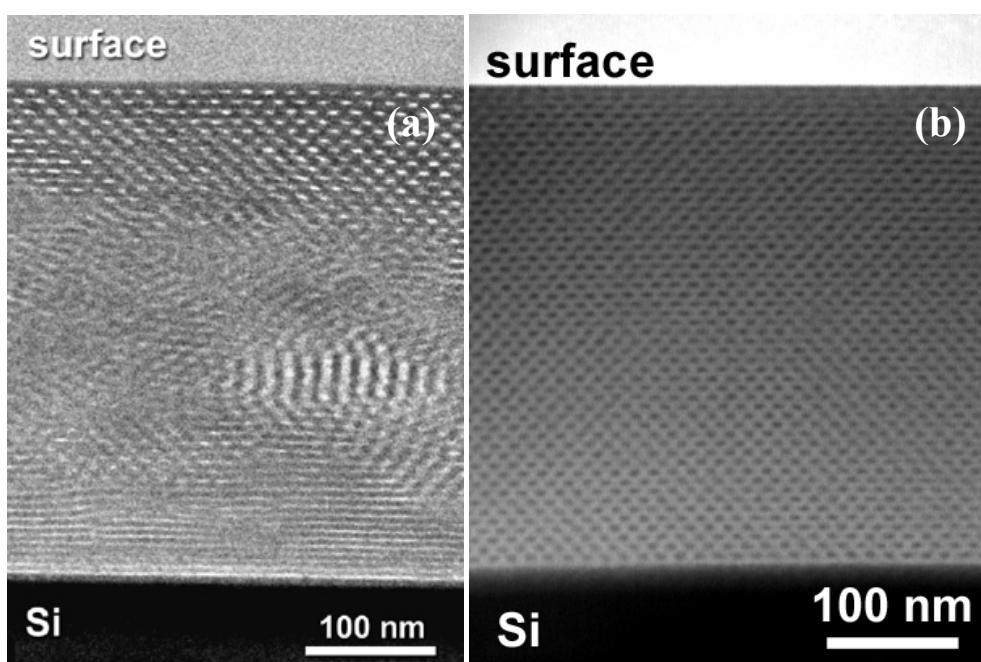
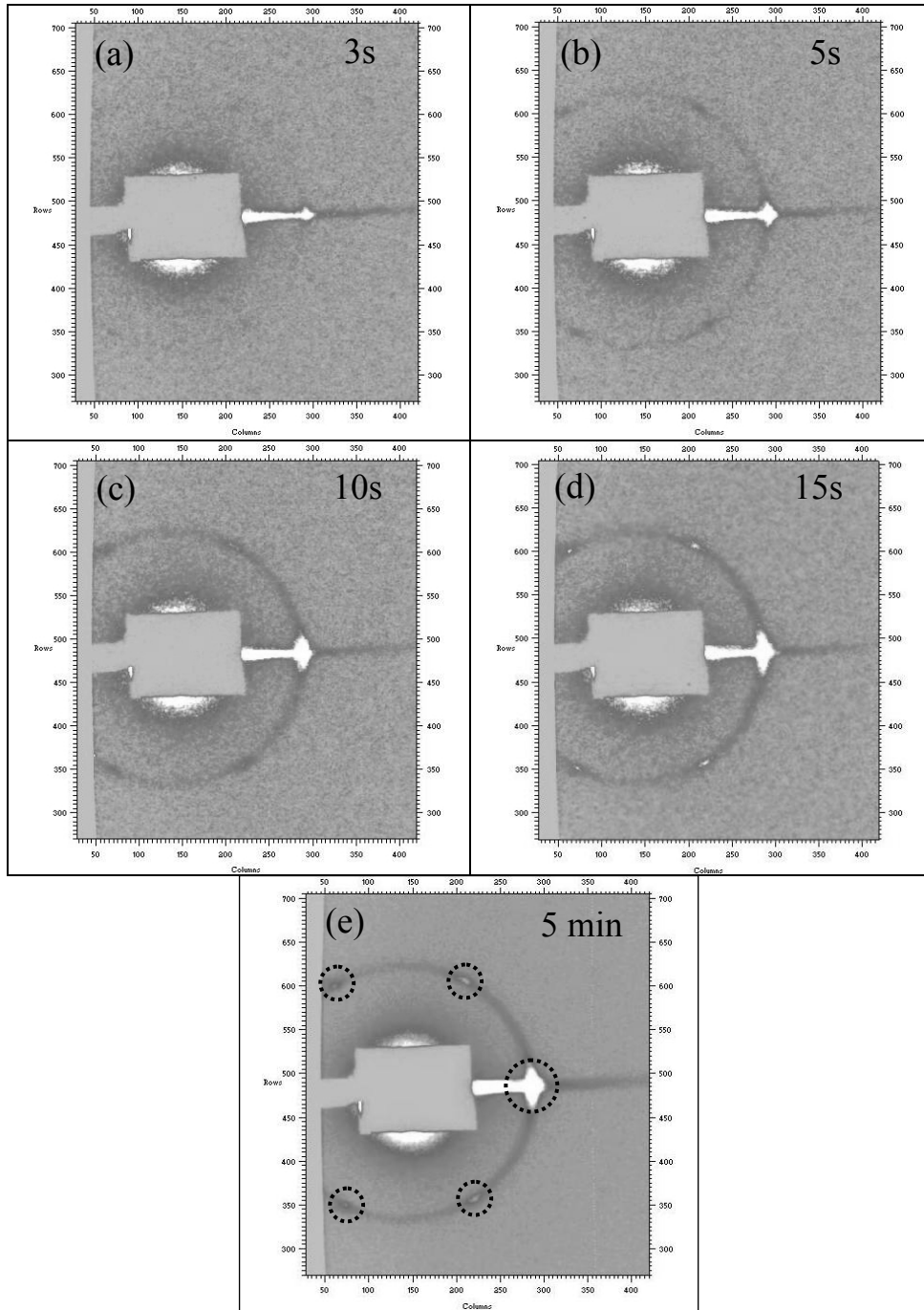


Supplementary information



1. Bright-field cross section TEM image of a TEOS-F127 film **(a)** compared with a dark-field cross section TEM image along the [110] direction of a MTES-TEOS-F127 film **(b)**. Both samples were calcined at 400°C.



2. SAXS images taken in real time during the dip-coating of a MTES-TEOS-F127 film. Pixel scales are shown, giving to the reader the possibility to check the evolution of every single spot. SAXS measures were performed in transmission using a thin silicon substrate ($8 \mu\text{m}$). Multiple images (**a**, **b**, **c**, **d**) were recorded every second, with an exposition time of 1 second (no delay between acquisitions). The image (**e**), recorded after 5 minutes from deposition averaging 10 single acquisitions with 3 seconds of exposition time, allows a clear spots identification (hollow dotted circles) enhancing the signal-noise ratio.