

The cross-sectional SEM image

The cross-section SEM images of the six-layer TWAR coating is very important in this work. SEM was performed using a Hitachi-S4800 high-resolution SEM at an acceleration voltage of 5.0 kV. The coating was coated on a silicon wafer. The coated silicon wafer was broke and then the cross-section was coated with Au prior to SEM imaging. Actually, the authors have tried to take the SEM images of single-layer coating of *L layer*, three-layer coating of *L layer/L' layer/L layer* and the six-layer TWAR coating. However, the authors could not get some useful cross-section SEM images for multi-layer sol-gel silica thin films. The following picture is the cross-section SEM image of three-layer coating of *L layer/L' layer/L layer*. We can only obtain the thickness of three-layer thin film, and no more useful information can be read from this picture. The surface is covered with a layer of Au particles, and the morphology of the boundary (interface) cannot be read. So, based on the sol-gel science, the author proposed the crack problem and the ORMOSIL in avoiding the formation of crack to explain the different between inorganic and ORMOSIL six-layer TWAR coating.

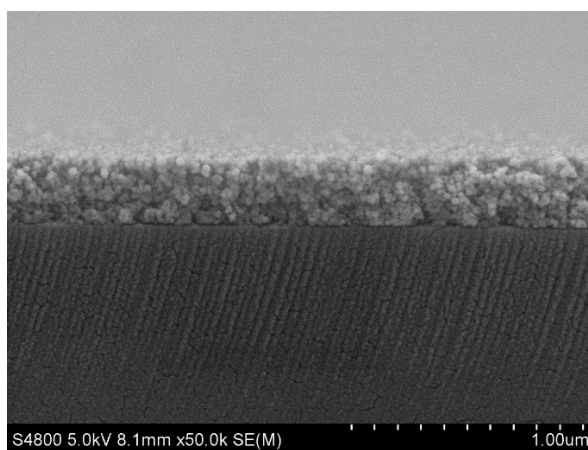


Figure 1 Cross-sectional SEM images of three-layer coating of *L layer/L' layer/L layer*