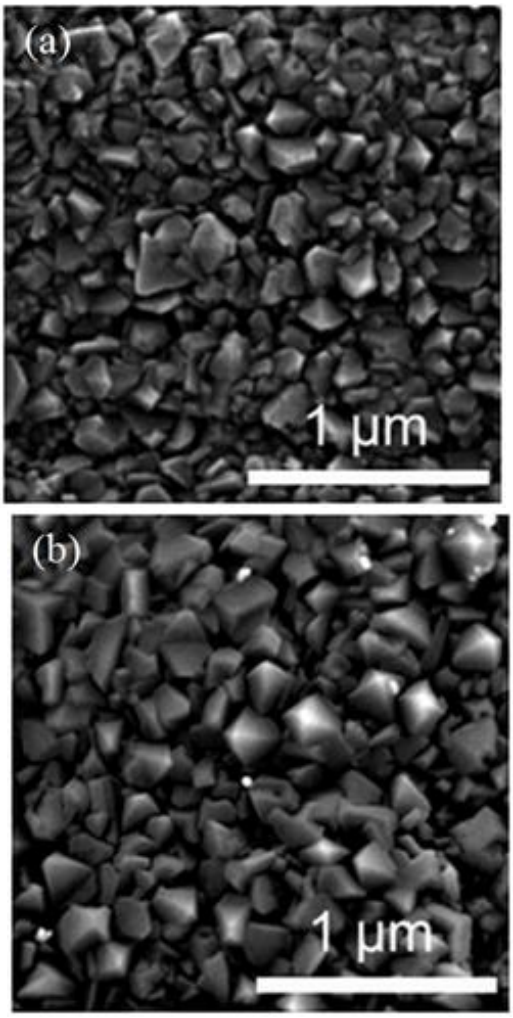

Fig.1 SEM of the initial surface of a Zr alloy sample covered with 300 nm thick NCD
(a) and the surface after 30 days of exposure processed to 360 °C hot water
to 360 °C hot water
(b) No microstructural changes were observed in the hot-water-processed NCD film.

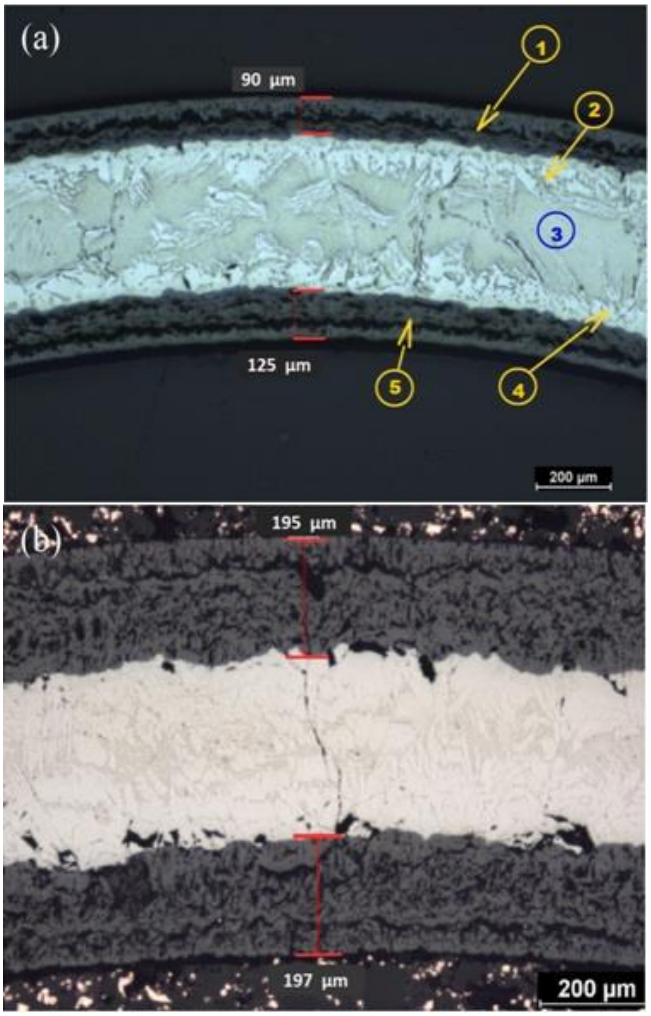

Fig.2 Optical microscopy images of the metalographic cross section
(a) 300 nm NCD coated ZIRLO tube sample processed 1 h at 1000 °C in hot steam.
(1) Outer surface zirconium dioxide ZrO2 layer, with a thickness of 90.8 µm.
(2) Outer surface oxygen-stabilized zirconium α phase (solid Zr-O solution).
(3) Initial Zr β phase (metastable modified hexagonal close-packed structure).
(4) Inner-surface oxygen-stabilized Zr α phase.
(5) Inner surface ZrO2 layer, with a thickness of 125.02 µm.
(b) Uncoated ZIRLO tube sample subjected to hot steam (1000 °C / 1 h). On the outer surface of the tube, the ZrO2 thickness was 195.1 µm;
on the inner surface the ZrO2 thickness was 196.8 µm