

Nano-ZrO₂ Film Improved Tribocorrosion Performance of Surface-Textured Stainless Steel in 0.9% NaCl Solution

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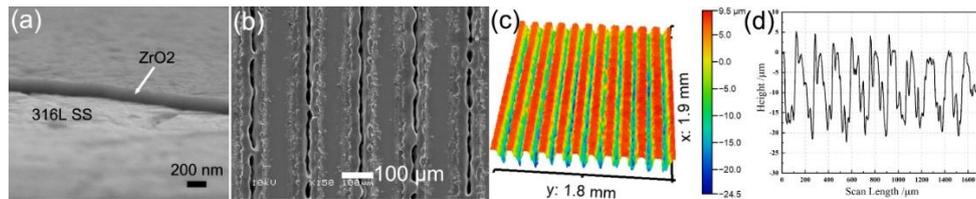


Fig. 1 Surface of groove-textured 316L SS with nano-ZrO₂ film deposited at 300 °C. (a) Surface morphology of ALD ZrO₂ film, (b) Surface morphology, (c) 3D topography, and (d) Surface profile of groove-textured 316L SS with ALD ZrO₂ film.

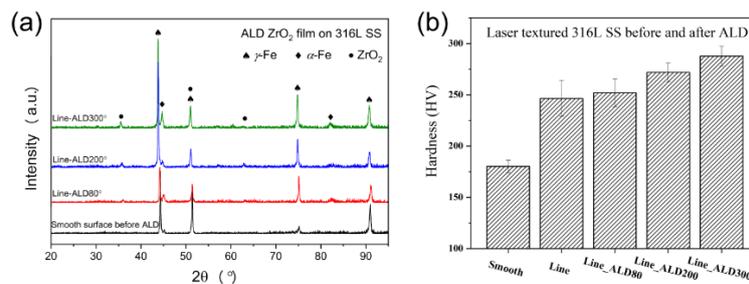


Fig. 2 XRD patterns (a) and surface hardness (b) of 316L SS with and without ALD nano-ZrO₂ film.

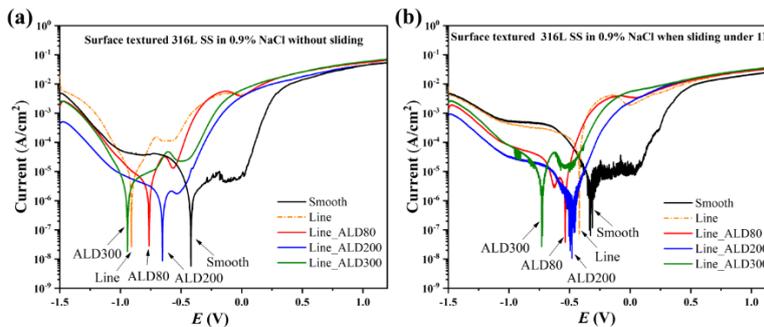


Fig. 3 Polarization curves of laser textured 316L SS before and after ALD with different deposition temperatures: (a) Without sliding, (b) With sliding at 20 mm s⁻¹.

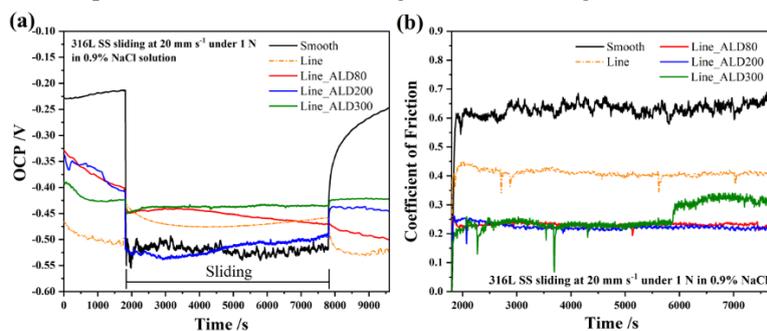


Fig. 4 Open corrosion potential and coefficient of friction when sliding under 1 N at 20 mm s⁻¹ in 0.9% NaCl solution, (a) Variation of OCP with time, and (b) Variation of COF with sliding time.

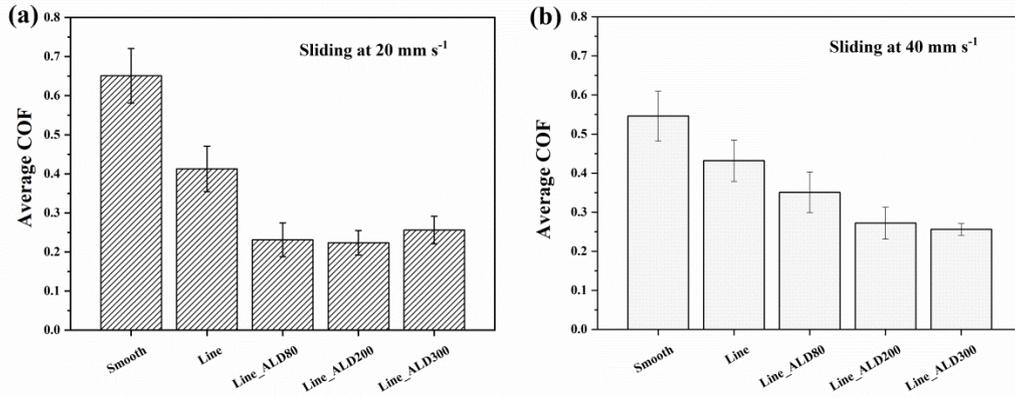


Fig. 5 Average COF of smooth and surface textured 316L SS when sliding in 0.9% NaCl solution under 1 N at (a) 20 mm s⁻¹, and (b) 40 mm s⁻¹, respectively.

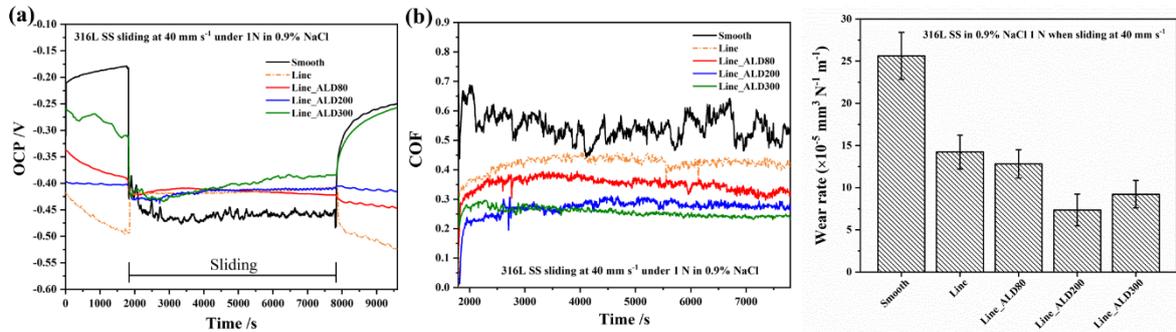


Fig. 6 Open corrosion potential and coefficient of friction when sliding under 1 N at 40 mm s⁻¹ in 0.9% NaCl solution, (a) Variation of OCP with time, and (b) Variation of COF with sliding time. **Fig. 7** Average wear rate of smooth and surface textured 316L SS when sliding under 1 N at 40 mm s⁻¹ in 0.9% NaCl solution.

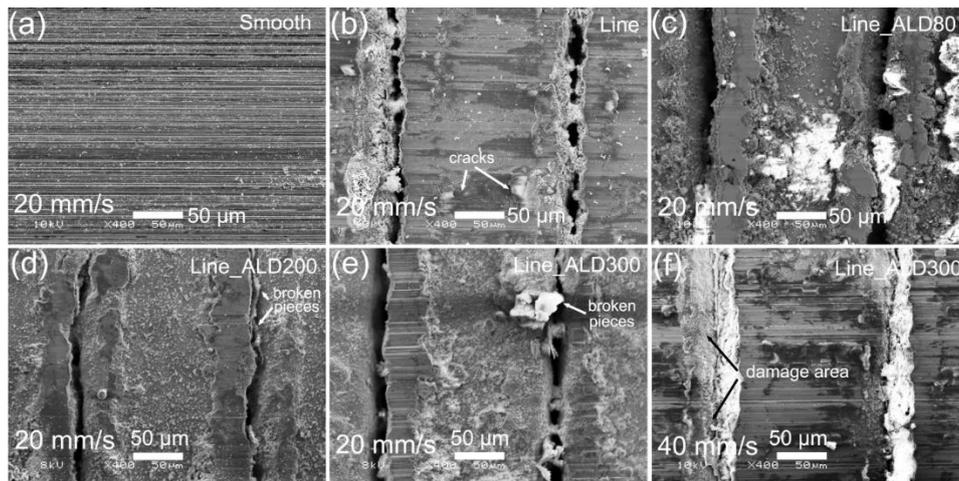


Fig. 8 Worn morphologies of 316L SS samples after sliding wear in 0.9% NaCl solution, (a) Smooth surface of 316L SS sample without surface texturing, (b) Linear groove-textured 316L SS, (c) Surface textured 316L SS with 80 °C deposited ZrO₂ film, (d) Surface textured 316L SS with 200 °C deposited ZrO₂ film when sliding at 20 mm s⁻¹, and (e) Surface textured 316L SS with 300 °C deposited ZrO₂ film when sliding at 20 mm s⁻¹, and (f) Surface textured 316L SS with 300 °C deposited ZrO₂ film when sliding at 40 mm s⁻¹.