# Analysis of surface characteristics of TNTZ by high-pressure torsion and laser texture

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Ti–29Nb–13Ta–4.6Zr alloy (TNTZ) was processed by high-pressure torsion (HPT) for 20 turns. The microstructure of HPT-processed 20 turns sample became finer than that without HPT-processed sample and the mechanical properties were increased as well [1]. Laser surface treatments were applied to HPT-processed or without HPT-processed samples. When the laser parameters operated at higher power or slower scan rate, the higher roughness on the surface was achieved. After the laser treatment, the surface property became hydrophilic and the contact angle is below 10°. Following the 7 days of exposure in air, the contact angle begun a steady-state hydrophobic surface [2]. In this study, the electrochemical properties of TNTZ samples are investigated. According to these results, the corrosion potential or the corrosion current of HPT-processed sample is better than that without HPT-processed sample. It indicates that HPT sample has a certain effect on the improvement of corrosion performance. Therefore, the surface contact angle and corrosion resistance of TNTZ alloy is improved by combining the laser treatment and HPT process.

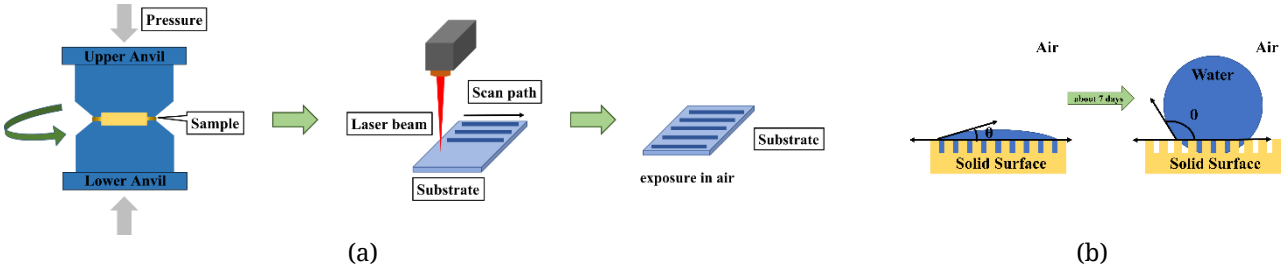


*Figure 1 (a) Experiment flow chart including the high-pressure torsion, laser treatments, and exposure in air. (b) Wenzel model to explain the hydrophilic to hydrophobic process [3].*

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