Nano-Hardness Mapping of Austenitic Steel 316L with Different Surface Treatments

Jana Šimeg Veterníková [a], Jarmila Degmová, Stanislav Sojak, Milan Pavúk
and Vladimír Slugeň

*Institute of Nuclear and Physical Engineering, Faculty of Electrical Engineering and Information Technology,
Slovak University of Technology, Ilkovičova 3, 812 19 Bratislava, Slovakia.*

[a] Corresponding author: jana.veternikova@stuba.sk

Abstract. Mechanical and thermal degradation of austenitic steel 316L were observed for three different processes of grinding. The structural changes and a depth of the affected zones were investigated by nano-hardness for the samples in a cross-section from the surface to the depth of 450 µm. The effect of standard wet mechanical grinding and supercritical CO_2 ($scCO_2$) method without or with minimum quantum of lubricant (MQL) were compared. Although, the average nano-hardness of the samples differs only in ± 0.1 GPa, the significant change of the nano-hardness was found in first layers up to 20 µm under the surface. The sample formed by $scCO_2$ + MQL proved minimal structural degradation after the surface treatment.