



Enhanced passivation layer by Cr diffusion of 301 stainless steel facilitated by SMAT

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Abstract:

AISI 301 stainless steel (SS) is known for its high strength and hardness but tends to be less corrosion resistant for many applications. Several attempts have been made in the past to investigate its corrosion behaviour by different methods. However, current knowledge is insufficient on its corrosion resistance when subjected to surface treatment. In this work, a new route to enhance the corrosion resistance of nanostructured 301 SS using surface mechanical attrition treatment (SMAT) method is described. SMAT improves the mechanical properties of 301 SS by the formation of a nanostructure layer on the material surface. Compared to the as-received 316 and 304 SS counterparts, the present nanostructured 301 SS exhibits an improved corrosion behaviour by a lower corrosion current density (1.308 mA/cm²), higher corrosion potential (-0.071 V), higher phase angle and impedance, better charge-transfer resistance, and Cr content. The improved corrosion resistance can be attributed to the ability of SMAT to facilitate the move of Cr on the surface, which forms a stronger passivation layer with a new mechanism of passivation that may save a lot of noble metals.

Biography:

Simion Simon is Emeritus Profesor at Babes Bolyai University. He is the director of Interdisciplinary Research Institute on Bio- Nano- Sciences. As researcher he published more than 250 papers in internationally scientific journals, receiving more than 2000 citations (excluded



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Publication of speakers:

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2. L. Chiriac, M. Todea, A. Vulpoi, M. Muresan-Pop, R.V.F. Turcu, S. Simon, Freeze drying assisted sol-gel derived silica based particles embedding iron: synthesis and characterisation, *J. Sol-Gel Sci. Technol.* 2018, 87 (1) 195-203.
3. M. Todea, M. Muresan-Pop, A. Vulpoi, S. Simon, D. Eniu, Heat treatment effect on structure and in vitro bioactivity of titanosilicatemicrospheres, *Applied Surface Science* (2018) 457:838-845.

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