

Effect of UV exposure time on physicochemical properties of sol-gel derived coatings

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INTRODUCTION. Sol-gel processing is beneficial in the formation of ceramic and glass films for many reasons. Numerous parameters involved in the sol-gel technique have an important influence on structural and physicochemical properties of a synthesized material. The factor as UV irradiation has significant impact on the physicochemical structure of obtained silica network. **GOAL AND PROCEDURE.** The Authors special attention was focused on the effects of UV irradiation and aging time of sols onto physicochemical and structural properties of sol-gel hydrolyzate and derived coatings. All the processing conditions such as the chemical composition of reagents, the drying time, the parameters of dip-coating process were identical, but the UV irradiation time was varied. **FINAL RESULTS.** Prolongation of UV exposure time causes an increase in hydrophilicity and surface roughness of metallic substrate coated by SiO₂ containing vinyl groups. Obtained results indicate that after 1 h of UV exposure, surface roughness and hydrophilicity reach the highest values. Moreover intensity of C=C bands decreases with prolonged UV irradiation time, which presumably will have a positive impact on network expansion.

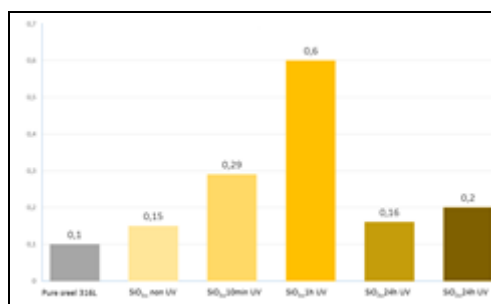


Fig.1. Arithmetic average roughness (R_a) for obtained silica sol-gel derived coatings irradiated UV light.

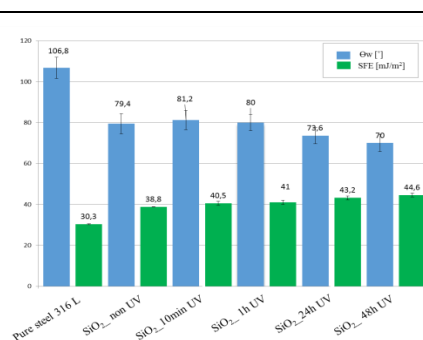


Fig.2. The dependence of the θ_w (water contact angle) and SFE (surface free energy) from time of UV irradiation time.

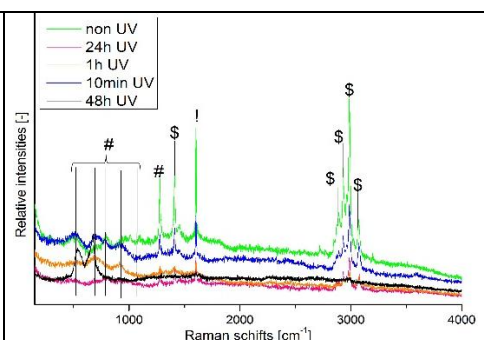


Fig.3. Raman spectra of obtained silica sol-gel derived coatings with different time of UV irradiated.

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