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Synthesis of functionalized poly(methyl methacrylate) layered double hydroxide

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Free radicle polymerization of methyl methacrylate is one of the most successful methods to polymerize widely explored biomaterial because of its biocompatibility. Polymerization of methyl methacrylate with thiourea can be prepared by free radical polymerization reaction. Thiourea is also added during the polymerization as functional end group in poly(methyl methacrylate). Ferric chloride initiator has been used to initiate polymerization reaction and to attach thiourea group at the end of chain through radical addition process. The chemical structure of the synthesized polymer has been characterized by 1H-NMR, Fourier Transform Infrared Microscopy (FTIR) and UV-Spectra. Incorporation of thiourea at the end of polymer chain which is bonded to the carbon atom of PMMA was demonstrated by 1H-NMR and FTIR.

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Surface modification of laser alloyed Al-Sn coatings on UNS G10150 steel in acidic environment: Artificial neural model approach

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Surface deterioration by corrosion is one of the complications associated with ageing facilities and components especially under some service environments. The research work examines the corrosion behaviour of laser alloyed UNS-G10150 steel; coatings have been obtained by laser surface alloying technique. Binary combinations of Al/Sn metallic powders were mixed and injected onto the surface of UNSG10150 mild steel substrate under different laser processing parameters. The steel alloyed samples were cut to corrosion coupons, immersed in hydrochloric acid (1M HCl) solution at 28°C using electrochemical and gravimetric techniques and investigated for its corrosion behaviour. The morphologies and microstructures of the developed coatings and uncoated samples were characterized by Optic Nikon Optical microscope (OPM) and scanning electron microscope (SEM/EDS). Moreover, X-ray diffractometer (XRD) was used to identify the phases present. The improved surface properties were attributed to the formation of new inter metallic and corrosion phases (Al_3Sn_9, Al_5Sn_6, AlSn $(OH)_6$, Al_2SnO_4, $Al_5(OH)_8Cl_2.H_2O$, $Sn_3O(OH)_2Cl_4$, $Al_4ClO_4(OH)_7$) and fine eutectic microstructures. In addendum, Artificial Neural Network Model [ANN] was used for the optimization and modeling of the laser parameters since processing parameters played an important role in the quality of alloyed coating produced. Corresponding experimental results show a good qualitative conformity with the numerical model predictions.

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