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3P34 - Growth of photocatalytically active coatings on aluminum by Plasma Electrolytic Oxidation

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In many situations the performance of a given material is determined primarily by the properties of its surface. That is the case of photocatalytic degradation systems, where organic compounds are mineralized through chemical reactions stimulated by the light illuminating certain materials. Such effect can be enhanced by using treatment techniques able to adjust the surface characteristics, preferentially, without affecting bulk properties. In this context, plasma electrolytic oxidation (PEO) is very convenient because it enables the production of highly porous surfaces with tailored morphology and composition. In this work, photocatalytic active coatings have been grown on aluminum substrates by PEO using TiO2-containing electrolytes. The samples have been characterized by scanning electron microscopy with x-ray energy dispersive spectroscopy, x-ray diffraction and surface area measurements. The photocatalytic activity has been quantified evaluating the degradation rate of metformin. It has been observed that the coatings are mostly constituted by a mixture of rutile and anatase phases. Under certain conditions, 100% of metformin has been degraded after irradiation with UV-light for 90 minutes.

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