Development of a superhydrophobic coating for aluminum alloys

Project presented to UIT Le Creusot students

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Host institution:

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Sol-gel coating technology allows to modify surfaces, producing new materials with improved properties and new features such as low friction surfaces, surface tension change, increased hardness, or risk resistance. Sol-gel coatings can be applied by purely chemical methods and applied by immersion or spraying, or, in the case of conductive substrates, by electrophoretic method, which allows better process control and tailoring of film properties. Corrosion protection of metal substrates is one of the many applications of sol-gel technology. Hydrophobicity of a coating can be an advantage in preventing corrosion, by repelling water that is a crucial element in atmospheric corrosion. Recently, we have developed a superhydrophobic coating for metal substrates, based on electrophoresis. The aim of this project is to grow hydrophobic silicate films on an aluminum alloy for Aeronautics, targeting the improvement of corrosion resistance. The films should act as a moisture repellent and thus protect aluminum from against corrosion. The morphology and coating properties will be studied by microscopy, surface tension by determination of the contact angle and electrochemical measurements.

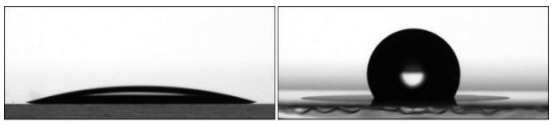

Fig 1: Hydrophilic vs. hydrophobic surfaces (*Image credits: https://www.platypustech.com/*)

Supervison: Alda Simões (associate professor)

General Bibliography:

Miguel F A Evaristo, Development of a sun-gel coating with hydrophobic behavior for aluminum alloy substrates, MSC thesis, IST; university of Lisbon, 2017 (in Portuguese)

R. del Olmo, U. Tiringerb, I. Milosev, P. Visser, R. Arrabal, E. Matykina, J.M.C. Mol, Hybrid sol-gel coatings applied on anodized AA2024-T3 for active corrosion protection Surface and Coatings Technology 419 (2021) 127251