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Development and Characterization of a Fluorinated-Ethylene-Propylene (FEP) Polymer Coating on Brass Faucets

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Abstract : Research is increasingly moving towards the use of surface treatment processes to limit environmental effects. Electrolytic plating has traditionally been seen as a way to protect brass products, especially faucets, from mechanical and chemical damage. However, this method was not effective industrially, economically and ecologically. The aim of this work is to develop non-usual polymer coatings for brass faucets in order to improve the performance of brass and to replace electrolytic chromium coatings, thereby reducing environmental impact. Fluorinated-Ethylene-Propylene polymer (FEP) was chosen for its excellent mechanical and chemical properties and its good environmental performance. This coating was developed by spraying (painting) process onto brass substrates. The coatings obtained were characterized using a scanning electron microscope to evaluate the morphology of the deposits and their porosity rate. Grid adhesion, surface energy and corrosion tests (salt spray) were also performed to evaluate the mechanical and chemical behavior of these coatings properly. The results show that the deposits obtained have a homogeneous microstructure with a very low porosity rate. The results of the grid adhesion test prove the conformity of the test according to the NF077 standard. The coatings have a hydrophobic character following the low values of surface energy obtained and a very good resistance to corrosion. These results are interesting and may represent real technological issues in the industrial field.

Keywords : FEP coatings, spraying process, brass, adhesion, surface energy, corrosion resistance
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