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Study graphene-based coating 3D printing process in magnetic remanence and corrosion of NdFeB magnets

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This study belongs to the sector of new types of coatings. More particularly, this work refers to a 3D printing process (Fused Deposition Modeling) using thermoplastic polylactic acid (PLA) filament to create a rigid and plastic, non-conductive and anti-corrosion layer. Possibility of 3D printing a plastic layer using explored fused deposition modeling methods. With the use of additive manufacturing such a commercial magnet geometry N35 8x NdFeB can be devised to produce an efficient shielding film. Different 3D printed settings such as material type and layer thickness were printed. Types of 3D coatings were tested, articulated iron-impregnated polylactic acid (PLA-Fe) and graphene-impregnated polylactic acid (PLA-G). As the coating layer thickness increases, the remanence decreases from 1.193 mVs to 1.062 mVs for the PLA coating, from 1.209 mVs to 1.083 mVs for the PLA-Fe coating, and from 1.187 mVs to 1.070 mVs for the PLA-G coating. Visual tests of all aqueous NaCl solution coatings (0.5M and 1M) were performed, there were no evidence of corrosion tests for all coatings.