
New application for geopolymer materials: integration as matrix in Antennas

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Abstract

Geopolymers have gained tremendous interest as promising materials, environmentally friendly and with good working properties. These mineral binders result from the activation of an aluminosilicate source by an alkaline solution at room temperature. These materials can be used in several applications such as building and construction materials. An innovative use of these materials is their integration in Antennas. The added value of the use of geopolymer material is the possibility to control the dielectric permittivity value of the material, which can be directly poured into the antenna, without exothermic reaction like in case of resin. The objective of this study is to evaluate the suitability of geopolymer material for such application and to improve the formulation in order to obtain the desired dielectric properties. For this purpose, many formulations (dense and porous materials) and synthesis conditions were tested. Then, the evaluation of dielectric permittivity value of the material was performed for many formulations and synthesis conditions. Based on the feasibility tests, it was shown that porous geopolymer materials can be successfully used and leads to sufficient dielectric properties and adhesion to antenna's material which is stainless steel. Moreover, the optimized parameters of the synthesis and the drying process were 70°C and 90°C, respectively. The preparation of the material with the desired dielectric permittivity value and the filling protocol are in the final phase.

Keywords: geopolymer, inorganic, binder, amorphous, application, antenna, dielectric properties

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