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The Influence of the Alloying Elements on the Adhesive Properties of Epoxy-Quasicrystal Composites

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Quasicrystals (QC) are usually complex metal alloys with atypical structures. Due to their physical, mechanical and surface properties, quasicrystals have been widely studied. Although methods to manufacture quasicrystalline materials are well known, much effort has been expended in obtaining suitable quasicrystalline materials for use in industry. As quasicrystalline materials are very brittle, they are usually used in powder form as a reinforcement for additives in composites as well as in coating technology. In this work, the effect of each quasicrystal alloying element incorporation on the adhesive properties of the epoxy resin was investigated. Single lap joints (SLJ) adhesion tests were performed in order to assess the shear mode bond strength. The composites used in the tests were prepared with different amounts of Al, Cu or Fe in the epoxy resin. The effect of increasing amounts of these elements on the adhesion was analyzed and compared with the results obtained for Al-Cu-Fe quasicrystalline particles incorporation to assess the influence of the alloying elements on the adhesion of epoxy-quasicrystal composites.

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