Short Communication

Preparation and Corrosion Behavior of Chemically Bonded Ceramic Coatings Reinforced by Functionalized Graphene Oxide

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Graphene oxide (GO) was decorated by 3-aminopropyltriethoxysilane (APTES) through the reactions of carboxylic and epoxide groups with amino groups. Then, the chemically bonded ceramic coatings were prepared with the addition of functionalized GO. The dispersion quality of GO in the ceramic matrix was examined by scanning electron microscopy (SEM), which revealed no cracks or space between GO and ceramic matrix. The corrosion protection of the ceramic coatings was characterized by potentiodynamic polarization testing after immersion in 3.5 wt% NaCl solution for 10 h at room temperature. The corrosion resistance of the ceramic coatings was remarkably improved with the addition of the functionalized GO. The protection efficiency of the ceramic coatings increased to 90% with the addition of 0.6 wt% functionalized GO. The enhancement of the anticorrosion performance was mainly attributed to the barrier properties of the well-dispersed functionalized GO in the ceramic matrix.

Keywords: Graphene oxide, Amino groups, Chemically bonded ceramic coatings, Corrosion protection

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