

Size-dependent corrosion behavior of graphene oxide coating

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ABSTRACT

Graphene oxide emerges as an effective corrosion resistant coating. However, the influence of graphene oxide sheets size on the corrosion protection remains unclear. In this report, we investigate the effect of different graphene oxide (GO) sheets size in the formation of corrosion resistant coating. We provide valuable input for electrophoretic deposition in which GO sheets in smaller size diffuse faster during deposition to cause more oxygen reduction, thereby forms a coating with higher hydrophobicity, stronger adhesion, and lesser pinholes. Detailed electrochemical impedance analysis shows that the coating formed from GO sheets in smaller size exhibits higher activation energy for water diffusion, causing slower water diffusion rate and lower permeation into the coating. The findings suggest that GO sheets in smaller size produce a reliable coating with excellent corrosion resistance behavior.

KEYWORDS

Sheet size; Coating; Electrodeposition; EIS; Corrosion protection

ACKNOWLEDGMENTS

The authors would like to acknowledge the funding from the Ministry of Education Malaysia in the form of [RDU170113: FRGS/1/2017/STG07/UMP/01/1] and Universiti Malaysia Pahang grant RDU170357. Moreover, the authors extend their appreciation to King Khalid University, the Ministry of Education – Kingdom of Saudi Arabia for supporting this research through a grant (RCAMS/KKU/002-18) under research center for advanced material science.