Electrophoretic Deposition of Superhydrophobic Al/Fe₂O₃ Nanothermite with Long–Term Storage Stability

Haibing Zhang¹, Haitao Wu¹, Peng Xu², Zidong Li¹, Wuyang Zhang¹, Huixian Huang¹, Qing Zhou¹, Xingui Yue¹, Jiankang Bao¹, Xueming Li^{2,*}

¹ State Grid Chongqing Electric Power Company, Chongqing 400015, China

² School of Chemistry and Chemical Engineering, Chongqing University, Chongqing 400044, China

*E-mail: xml301@cqu.edu.cn

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In this study, a superhydrophobic Al/Fe₂O₃ nanothermite with long–term storage stability was prepared by electrophoretic deposition of nano–Al particles and nano–Fe₂O₃ microboxes on Ti substrate and subsequent modification process. The composition and morphology of Al/Fe₂O₃ nanothermite were systematically characterised through X–ray diffraction and scanning electron microscope. In addition, the water contact angle measurements and the immersion test demonstrated the excellent superhydrophobic properties of the as–prepared Al/Fe₂O₃ nanothermite. 10 days after underwater immersion, the heat release of the superhydrophobic Al/Fe₂O₃ nanothermite remained 982.7 J/g, which was higher than 514.6 J/g of the sample without superhydrophobic treatment. This work provides a beneficial sight for enhancing the long–term storage stability of nanothermite in practical application.

Keywords: Nanothermite; Heat release; Superhydrophobic; Stability; Al/Fe₂O₃

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