Optimization of high-temperature oxidation process and corrosion resistance evaluation of industrial pure zirconium

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Abstract Industrial pure zirconium have very widely application foreground as a metal material with excellent physical and chemical properties in aerospace, nuclear energy, chemical industry and other fields.In high temperature environment, Oxidation behavior and corrosion resistance play a decisive part in the application and durability of materials. In the paper,we carry out thermal oxidation experiments of industrial pure zirconium to obtain the optimized process of high-temperature oxidation and improve the possibility of its corrosion resistance.The phase, surface morphology and cross-sectional morphology of industrial pure zirconium after thermal oxidation were analyzed by XRD, SEM and theoretical calculation. The corrosion resistance of industrial pure zirconium in 15% sulfuric acid was obtained by electrochemical measurement. A layer of oxide film is formed on the surface of industrial pure zirconium after thermal oxidation, it becomes denser and more uniform with the increase of oxidation temperature and the extension of oxidation time.The results show that the corrosion resistance of industrial pure zirconium after thermal oxidation at 600℃ for 50h is better than others.

Keywords Industrial pure zirconium； Corrosion resistance； electrochemical measurement

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