ALUMINA CERAMICS CORROSION BEHAVIOUR ESTIMATED BY ARTIFICIAL NEURAL NETWORKS

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Abstract: *Artificial neural network models were used for estimation of corrosion behaviour of a cold isostatically pressed (CIP) high-purity alumina ceramics in aqueous HCl solution. Corrosion tests were performed with initial mass concentrations of HCl aqueous solution of 2, 10 and 20 wt. % at room temperature. Immersion times were 24, 48, 72, 120, 168 and 240 hours. Chemical stability was monitored by the amount of Al^{3+}, Mg^{2+}, Ca^{2+}, Na^{+}, Si^{4+} and Fe^{3+} ions eluted in different concentrations of HCl solution by means of atomic apsorption spectrometry (AAS), expressed as the amount of eluted ions in mg per square centimetre of test alumina area ($\mu g\ M^{n+}/cm^2$). The initial HCl aqueous solution concentration and immersion time were inputs to the neural network, and the output was the amount of eluted ions ($\mu g\ M^{n+}/cm^2$). Error back-propagation learning algorithm, with Levenberg –Marquardt method, was applied to the feed forward neural networks.*

Key words: *alumina ceramics, acid corrosion, corrosion kinetics, artificial neural networks, estimation*

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