rate follows pseudo second order kinetics and the adsorption is spontaneous and exothermic. It is possible to recover Cr and carbon by NaOH stripping.


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Preparation and thermal properties of graphite foam/eutectic salt composite as a phase change energy storage material
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A graphite foam/eutectic salt composite was prepared by the infiltration of the foam by a molten binary eutectic nitrate (KNO3/NaNO3) to improve its thermal conductivity as a phase change energy storage material. The thermal properties and stability of the composite and the eutectic salt were investigated by differential scanning calorimetry and Raman spectroscopy. Results indicate that infiltration using a molten salt is an effective method to prepare the composite. The phase change temperature of the composite (221.3 °C) is similar to that of the salt (222.4 °C), and its latent heat is 3.74% lower. The composite has a thermal conductivity 102 times higher than the pure eutectic salt, because of the high thermal conductivity of the graphite. The microstructure of the composite remains unchanged after 100 phase change cycles.


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Adsorption dynamics of phenol in a fixed bed packed with activated carbon and stainless steel fiber-reinforced activated carbon paper
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Stainless steel fiber-reinforced activated carbon paper was prepared by a wet papermaking method, followed by a high temperature treatment, using stainless steel fibers as the reinforcement and coniferous wood pulp cellulose as the binder. A fixed bed for phenol adsorption was made by first packing granular activated carbon to a depth of 13 cm followed by 2 cm of the as-made paper near the outlet. The adsorption dynamics of phenol in the bed were investigated under different experimental conditions. Results show that the breakthrough curve of phenol in the bed is steeper than that in a bed packed only with activated carbon with the same bed height. The breakthrough time of phenol in the bed decreases and the breakthrough curves become sharper with increasing flow rate and inlet concentration. The length of the unused bed decreases by 14% compared with the bed packed with activated carbon only, indicating that mass transfer in the bed and its utilization ratio are improved by the paper packing.


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Microstructure of a pyrolytic carbon coating on a nuclear graphite substrate IG-110
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The molten salt reactor (MSR) is one of the six Generation IV reactors that is being reexamined today, owing to its unique fuel cycle capabilities and safety characteristics. IG-110 nuclear graphite a candidate material for constructing a MSR. However, the existence of large pores at its surface is a big problem due to the impregnation of molten salts and the diffusion of fission product gases into the graphite through the pores. A pyrolytic carbon (PyC) coating can act as a barrier coating on the nuclear graphite. Investigation of the microstructure and growth characteristics of PyC is very important for an understanding of the relationship between microstructure and performance. In this study, polarized light microscopy, scanning electron microscopy, transmission electron microscopy and synchrotron based grazing incidence X-ray diffraction were used to study the microstructure and growth characteristics of the PyC coating. Results show that the PyC coating shows three growth cones (a large cone, a smaller one and a regenerative cone) and exhibits a wave-like layered structure. The resulting structure is fairly dense. There are two kinds of textures in the PyC coating: smooth laminar and regenerative laminar, each of which contains two crystal structures with different interlayer spacings. The smooth laminar carbon has mostly a low degree of graphitization, while the regenerative laminar structure mainly has a high degree of graphitization. The PyC coating is a perfect barrier to gas infiltration due to its compact structure and it containing only nanopores rather than large pores.


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Electrodeposition of an aluminum coating on a graphite surface from a molten AlCl3-NaCl-KCl mixture
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An electrochemical method was used to deposit aluminum on a graphite plate in a molten NaCl–KCl–AlCl3 mixture with a weight ratio of 1:1:8 to form a coatings with different thicknesses. The thickness and morphology of the coating were controlled by the current density and electrochemical deposition time. Results indicated that the thickness of the coating increased with deposition time up to 240 min at a current density of 1.06 A/dm² and a dendritic structure coating was formed by increasing the deposition time beyond 300 min. The greater the current density, the faster the deposition rate. When the current density was increased to 3.28 A/dm², the thickness of the coating reached a maximum of 148 µm for an electrochemical deposition