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Tanso 229—Abstracts

Development of high thermal conductivity Al–Si/C/VGCF composites with C/VGCF foam

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In order to develop high thermal conductivity materials, Al–Si/C/VGCF composites were fabricated by infiltrating Al–Si alloy (JIS-AC3A) into carbon and vapor grown carbon fiber composite (C/VGCF) foam. There were no voids and an Al_4C_3 compound layer formed at the interface between the Al–Si alloy and the foam. The composites achieved higher thermal conductivity (129.5 W/mK) and lower coefficient of thermal expansion (16.4–19.7 ppm/K) than Al–Si alloy (121.0 W/mK, 22.4 ppm/K), although the flexural strength was decreased to about 1/3 that of Al–Si alloy.

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Dependence of electric double layer capacitance on electrolyte ion for carbon electrolyte interface

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The effect of the kind of electrolyte ions and carbon surface on electric double layer capacitance was investigated using graphitized carbon black (GCB), multi-walled carbon nanotubes (MWCNTs), or activated carbon (ACF) as active material and $(C_2H_5)_4NBF_4$, $(C_4H_9)_4NBF_4$, $(C_6H_{13})_4NBF_4$, $(C_2H_5)_4NCF_3SO_3$, or $(C_2H_5)_4N(CF_3SO_2)_2N$ as electrolyte salt for propylene carbonate solution. The GCB and MWCNTs, which have no or little microporosity, showed no dependence of the capacitance on the kinds of electrolyte ions. This suggests that the capacitance is not related to the size of ions adsorbed on the carbon surface in the absence of micropores. In the case of the ACF, smaller capacitances were observed when bulkier ions were adsorbing/desorbing. This tendency was more prominent for narrower micropore widths, which can be explained by the ion sieving effect of micropores.

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Enhancement of Pb(II) ions adsorption onto magnesium loaded activated carbon in aqueous solution

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Magnesium loaded activated carbon was prepared to increase the adsorption capacity of lead (II) ions from aqueous solution. In the case of sufficient amounts of surface acidic functional groups existing on the carbon, no significant improvement of heavy metal removal was observed even if the magnesium was loaded on it, but by removing surface oxygen compounds by out-gassing in a helium flow at 1173 K before magnesium loading, considerable enhancement of the heavy metal adsorption affinity onto the activated carbon could be observed. The amount of magnesium impregnation in the aqueous solution was also increased using the out-gassed carbon in the preparation. No detrimental effect was observed for

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