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PITCH-BASED CARBON FOAM AND COMPOSITES AND USES THEREOF

ABSTRACT

A thermally conductive carbon foam is provided, normally having a thermal conductivity of at least $40 \text{ W/m}\cdot\text{K}$. The carbon foam usually has a specific thermal conductivity, defined as the thermal conductivity divided by the density, of at least about $75 \text{ W}\cdot\text{cm}^3/\text{m}^3\cdot\text{K}\cdot\text{gm}$. The foam also has a high specific surface area, typically at least about $6,000 \text{ m}^2/\text{m}^3$. The foam is characterized by an x-ray diffraction pattern having "doublet" 100 and 101 peaks characterized by a relative peak split factor no greater than about 0.470. The foam is graphitic and exhibits substantially isotropic thermal conductivity. The foam comprises substantially ellipsoidal pores and the mean pore diameter of such pores is preferably no greater than about 340 microns. Other materials, such as phase change materials, can be impregnated in the pores in order to impart beneficial thermal properties to the foam. Heat exchange devices and evaporatively cooled heat sinks utilizing the foams are also disclosed.

FIG. 2



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