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RESEARCH ON THERMAL PROPERTIES OF HIGH-PERFORMANCE CARBON FIBER

Abstract

High performance carbon fiber has excellent mechanical properties, thermal properties and Resisting corrosion and so on, but also has outstanding Processing Properties because of the textile fiber soft, it is a very important strategic raw material. The thermal properties of high performance carbon fiber such as thermal expansion coefficient, thermal conductivity and many others , and research on the relationship between temperature, composition, structure is very important to the reinforced structural composites and function composites, and the relevant datas and reference literatures are very few. The experimentation investigation were carried out, and the datas of thermal properties of the high strength and high modulus carbon fiber and other series such as T300, T700, T800 series and M series with temperature were got ,through the special testing furniture, measuring sensors were designed, combined with the composition, lattice parameter analysis, its correlation wer summarized. The results showed that: with the fiber carbon content increases of T300, T700, T800 thermal conductivity increases, the resistivity and thermal expansion coefficient decreases, and the thermal conductivity and thermal expansion increases as the temperature increases, the resistivity decreases with the temperature decreases; while the thermal conductivity increases of the M series significantly with the degree of graphitization increases, and the resistivity and thermal expansion coefficient decreases with the degree of graphitization increases, and the thermal conductivity decrease with the temperature increases, the thermal expansion coefficient and electrical resistivity increases as temperature increases. The mechanism of heat transfer and resistance of Carbon fiber is mainly controlled by non carbon impurities, defects and structural carbon ordering degree;The thermal expansion coefficient becomes more and more smaller, and the temperature more and more higher from negative thermal expansion coefficient to positive thermal expansion coefficient, because directional draught and more higher processing temperature, and carbon whisker arrange more and more regularity along carbon fiber axes. Key words Carbon fibre, High-performance Thermal properties, Thermal conductivity.