

On the Physical Properties of Vitro Carbon

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Vitro Carbon is a kind of vitreous carbon made from acetone-furfural resin (A-F resin).

The condensation reaction of A-F resin is promoted with inorganic acid, and its carbonization reaction is also pyrolyzed in the nitrogen atmosphere.

The variations of specific density, electro specific resistance and X-ray analysis against heat treatment temperature (HTT) show that vitro carbon (Carbonized A-F resin) is a typical non-graphitizing carbon.

The electro specific resistance shows about constant value (1.0×10^{-2} ohm-cm) in the range of HTT 1,300 - 3,000°C. According to the X-ray analysis, the crystallite spacing, thickness and size are changed step-wise with HTT. The values of Shore and Knoop hardness at room temperature show two maxima in the range of HTT from 100°C to 3,000°C. The dynamic Young's modulus at room temperature varies with HTT, showing the maximum value at HTT about 1,300 - 1,600°C. The maximum values in compressive and transverse strengths show 1,800 and 530 kg/cm² respectively.

The rate of reflectivity increases in the range of HTT 300 - 900°C, showing 12.5% at HTT 1,000°C. The value of thermal expansion coefficient decreases with increase of HTT and indicates the minimum at about HTT 1,600°C.

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