ELECTRIC RESISTIVITY ANISOTROPHY OF BIOMORPHIC SiC/Si COMPOSITES ON THE BASE OF SAPELE

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Electrical resistivity of Sapele based biomorphic SiC/Si materials was measured in a wide range from 10 K to room temperature. The samples were fabricated by the reactive infiltration of molten silicon into a carbonized Sapele (African Entandrophragma Cylindricum) wood preform. All the studied samples contained residual Si (10-35 wt%). The volume fraction of the remaining Si in a sample was calculated by topological measurements of SEM images. An estimation of the summary interface area between Si and SiC per the unit volume for the studied samples was made on the basis of SEM image analysis.

It was found that the resistivity-temperature ($\rho(T)$) dependences have semi-metallic behaviour which becomes very close to linear metallic one at 100 K<T<300 K. The obtained values of resistivity were quite low ($\rho \approx 0.002$-0.02 ohm cm) and showed strong anisotropy: the resistivity along the wood grown axis was several times higher compared with one in the perpendicular direction. The extent of this anisotropy was in a correlation with the amount of residual Si (hence, with the amount of the residual porosity) in a sample. The resistivity perpendicular to the wood grown axis drastically increased with the Si content, whereas the resistivity parallel to it did not depend practically on the Si content. It is suggested that presence of residual carbon in the samples and carrier scattering at Si/SiC interphases could determine the observed character of $\rho(T)$ dependences.

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ПРОЧНОСТНЫЕ И ЭЛЕКТРОФИЗИЧЕСКИЕ СВОЙСТВА НАНОФАЗНЫХ КОМПОЗИТОВ Cu-Ta

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Изучены структура, прочностные и электрофизические свойства конденсатов бинарной системы Cu–Ta, компоненты которой не имеют взаимной растворимости в равновесных условиях. Объекты представляли собой фольги толщиной до 50 мкм.