

Nanocomposites and nanomaterials

Thermal expansion coefficient of FeCu containing multi-walled carbon nanotubes

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The objective of this note is the dilatometric study of the FeCu nanocomposite containing different quantities of multi-walled carbon nanotubes (MWCNTs). The measurements of Thermal expansion coefficient were made in perpendicular direction to the rolling plane. The samples are very fine ribbons. In this work three concentrations 0.5, 1 and 2% MWCNTs were required for the development of the studies nanocomposites.

The measurements of the expansion were carried out in the temperature range of 25-700 ° C. We observe that the dilatometric curves of the four nanocomposites are different. They each contain two dilatometric anomalies. Their temperatures differ from one nanomaterial to other. The MWCNTs quantity introduced in each sample plays a preponderant role. The relative variations $\Delta L/L$ of the nanocomposites are very different. They vary greatly with the concentration of MWCNTs. For the 2% MWCNTs content, $\Delta L/L$ is constant over the entire temperature range. This case has not been observed before.

For more information, several techniques were required (DSC, TG, Raman, IR, and XRD). The results obtained confirm the important role of the quantity of multi-walled carbon nanotubes introduced into the FeCu matrix. All the manipulations used to carry out this work are complementary and of an interesting contribution.