Nanocomposites and nanomaterials

Thermal expansion of quasi-two-dimensional organic conductors k-(BEDT-TTF)$_2$Cu[N(CN)$_2$]Cl

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Thermal expansion of single crystal (BEDT-TTF)$_2$Cu[N(CN)$_2$]C1 [1] was studied along the crystal layers using the method of precise capacitive dilatometry over the temperature range 2-285 K. The measured thermal expansion coefficient $\alpha(T)$ of the sample is positive in this direction over the entire temperature range. Anomalies of thermal expansion were observed in temperature intervals 29-30 K and 74-80 K. The anomaly near 30 K is, apparently, due to the transition from the high-temperature conductive phase to the antiferromagnetic insulator state. Peak of $\alpha(T)$ at 78 K corresponds to a phase transition because of orientational disordering of dimers BEDT-TTF. A broad maximum of $\alpha(T)$ in the temperature range 40–70 K, is apparently explained by fluctuations of charge within the dimers, and by spin fluctuations, which increases with increasing temperature, and decreases then in process of thermal disordering of dimers.

1. *Kund M., Mьller H., Kushch N. D., Andres K. and Saito G.* A study of the thermal expansion of isostructural organic radical cation salts ϰ-(BEDT-TTF) $_2$ Cu[N(CN) $_2$]X (X = Br, Cl,I)// Synthetic Metals.- 1995.- 70.-P. 951-952.