

Thermo-destruction of the fullerenes

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Studies of the thermal behavior of fullerenes and their condensed form - fullerites began with the receipt of a macroscopic. The research results of thermal stability available in the literature [1,2 etc.] are quite contradictory and ambiguous both for pure C_{60} , C_{70} and their mixture.

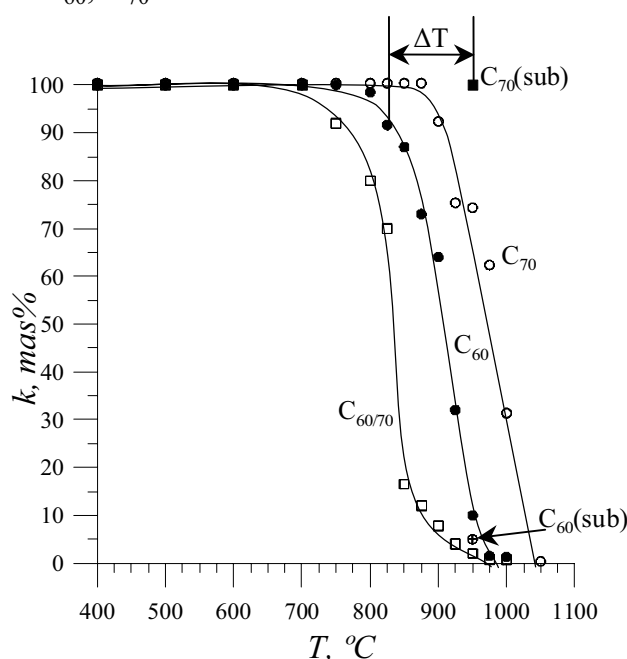


Figure. Change the number of fullerenes after annealing in an environment of CO, 30 min. UV- spectroscopy.

The thermal behaviour of the fullerenes and the fullerites (C_{60} , C_{70} and their mixture $C_{60/70}$) in CO conditions has been investigated by the X-ray structural analysis and the ultraviolet spectroscopy. It has been shown that the thermal decomposition occurs in the narrow temperature range. It has been established that the thermal stability of the fullerene C_{70} (>98%) is higher than that of C_{60} (99,5%). The critical stability temperatures of them have been determined as 950 и 850 C respectively. The initial decomposition temperature of the mixture $C_{60/70}$, obtained extraction from toluene solution is 775 °C. This temperature is lower than that of C_{60} and C_{70} .

It has been established that the critical decomposition temperature of the fullerenes and the fullerites is determined by the presence of impurities (oxygen and solvent). It has been shown that the crystallization of the fullerenes from gaseous phase is the most advantageous method of cleaning. At the same time the difference in the stability temperatures of C_{60} and C_{70} is, at least, $\Delta T = 125$ °C.

The decomposition kinetics of the fullerites mixture $C_{60/70}$ at $T = 800$ C has been investigated.

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[2] T.Sommer, T. Kruse, P. Roth, *J. Phys. B: At. Mol. Opt. Phys.* **29**, 4955 (1996).