

IR Spectroscopy Investigation of Purified Li@C₆₀ and Li@C₇₀

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The low energy ion bombardment method to produce endohedral fullerenes uses the co-deposition of purified fullerenes and positive ions with a well-defined energy in the range 30-70 eV [1]. The alkali ions are able to penetrate the carbon cage with relatively high probability at such energies allowing mg amounts of material to be produced.

Contrary to other isolated C₆₀ endohedral complexes [2] and Li@C₇₀, Li@C₆₀ exist in the form of more than one species [3]. The main part of Li@C₆₀ material was CS₂ soluble, and was separated by HPLC into two nicely resolved fractions (further denoted as E1 – fraction with shorter retention time, and E2). The minor rest of Li@C₆₀ material appeared to be soluble in pyridine/aniline. The IR spectroscopy study of these species showed that Li@C₆₀ E1 and E2 fractions exhibited interesting and rather similar features in the spectra. The IR features of pyridine/aniline soluble part of Li@C₆₀ are different and reminiscent to those of conducting organic polymers. The comparison of IR spectra of Li@C₆₀ species with that of C₆₀, C₁₂₀ and exohedrally alkali-metal doped C₆₀ materials will be discussed.

Finally, we present the IR spectroscopy data of purified Li@C₇₀.

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