ASSIGNMENT OF THE LOWEST EXCITED STATES OF C\textsubscript{70} AND EVIDENCE FOR FLUORESCENCE FROM THE S\textsubscript{2} STATE

A. SASSARA, G. ZERZA and M. CHERGUI, Institut de Physique Expérimentale, Université de Lausanne, CH-1015 Lausanne-Dorigny, Switzerland.

Highly structured fluorescence, phosphorescence and fluorescence-excitation spectra of C\textsubscript{70} in neon matrices are reported. Fluorescence from both S\textsubscript{1} and S\textsubscript{2} states is observed and these are identified as being of \textit{A\textsubscript{2}} and \textit{E\textsubscript{1}} symmetry and have gas phase energies estimated at 15560 and 15725 cm\textsuperscript{-1}, respectively. A third singlet state is identified in the excitation spectrum and is proposed to be of \textit{A\textsuperscript{\prime\prime}}\textsubscript{2} symmetry with an estimated gas phase energy of 16000 cm\textsuperscript{-1}. Finally, the phosphorescence is dominated by vibrational bands of \textit{E\textsubscript{1}} symmetry pointing to a lowest triplet state of \textit{A\textsubscript{2}} symmetry. Its energy lies at 12588 cm\textsuperscript{-1} above that of the ground state in the neon matrix. From a comparison with data from the literature, the existence of a second triplet state of \textit{E\textsubscript{1}} character is inferred, which lies about 165 cm\textsuperscript{-1} above the lowest triplet state, i.e. with the same energy separation as the lowest two singlet states.