

## ASSIGNMENT OF THE LOWEST EXCITED STATES OF C<sub>70</sub> AND EVIDENCE FOR FLUORESCENCE FROM THE SINGLET S<sub>2</sub> STATE

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Highly structured fluorescence, phosphorescence and fluorescence-excitation spectra of C<sub>70</sub> in neon matrices are reported. Fluorescence from both S<sub>1</sub> and S<sub>2</sub> states is observed and these are identified as being of A'<sub>2</sub> and E'<sub>1</sub> symmetry and have gas phase energies estimated at 15560 and 15725 cm<sup>-1</sup>, respectively. A third singlet state is identified in the excitation spectrum and is proposed to be of A''<sub>2</sub> symmetry with an estimated gas phase energy of 16000 cm<sup>-1</sup>. Finally, the phosphorescence is dominated by vibrational bands of e'<sub>1</sub> symmetry pointing to a lowest triplet state of A'<sub>2</sub> symmetry. Its energy lies at 12588 cm<sup>-1</sup> 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 E'<sub>1</sub> character is inferred, which lies about 165 cm<sup>-1</sup> above the lowest triplet state, i.e. with the same energy separation as the lowest two singlet states.