

RAFT Agent Photochemistry

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RAFT (reversible addition-fragmentation chain transfer) is a living radical polymerisation technique leading to low polydispersities and allowing for complex structures such as stars and blocks¹. The spectroscopic and photophysical properties of two common dithiobenzoate RAFT agents were investigated. Both agents were found to have fluorescence quantum yields on the order of 10^{-4} and maximum absorption bands at 300nm, assigned to the S_2 excited states.

The quenching of the model chromophore acenaphthene by a RAFT agent in solution and in a bichromophore was also studied. Quenching was found to operate via Förster resonance electronic energy transfer from the S_1 state of acenaphthene to the S_2 state of the dithioester RAFT agent. Time-correlated fluorescence lifetime measurements have been performed to determine the bimolecular quenching constant, k_Q , in ethanol to be $1.72 \times 10^{10} \text{ M}^{-1} \text{ s}^{-1}$.

¹ G. Moad, E. Rizzardo and S.H. Thang, Aust. J. Chem., 58 (2005) 379