

**Photochemistry and Photophysics of the
New C₁₂₀O₂ Isomer formed by Dimerization
of [5,6]-C₆₀O**

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It is found that the newly discovered [5,6]-open oxidoannulene isomer of C₆₀O efficiently dimerizes in toluene solution to form a new isomer of C₁₂₀O₂. Excited singlet- and triplet-state properties of the C₁₂₀O₂ product have been characterized by various spectroscopic techniques and compared to those of C₁₂₀, the [2+2]-dimer of C₆₀. The ground state absorption spectrum of C₁₂₀O₂ in toluene is slightly red-shifted relative to that of C₁₂₀, with a distinctive peak at 329 nm and an S₁←S₀ origin band at 703 nm. Its fluorescence spectrum shows two major peaks at 717 and 793 nm. In room temperature toluene, the measured triplet state intrinsic lifetime of this compound is 32 μs, a value slightly shorter than that of C₁₂₀ (44 μs). It is also found that C₁₂₀O₂ undergoes dissociation from its triplet state to give back its precursor, C₆₀O oxidoannulene. This oxidoannulene can thus be converted to C₁₂₀O₂ by thermal self-reaction and then restored to monomeric C₆₀O by photolysis. The quantum yield for C₁₂₀O₂ photodissociation has been determined to be several times greater than that for the comparable photodissociation of C₁₂₀. Further photophysical characteristics of the new C₁₂₀O₂ isomer as well as the results of mass spectrometric and NMR studies will also be presented.