

singlet molecular oxygen (singlet molecular dioxygen)

Oxygen molecule (dioxygen), O₂, in an excited singlet state. The ground state of O₂ is a triplet ($^3\Sigma_g^-$). The two metastable singlet states derived from the ground-state configuration are $^1\Delta_g$ and $^1\Sigma_g^+$ (the latter with the higher energy).

Notes:

1. Use of the term singlet oxygen alone, without mention of the chemical species is discouraged since it can also refer to an oxygen atom in a 1S or 1D excited state. The oxygen atom ground state is a triplet 3P state and the 1S and 1D states are also derived from the ground-state configuration.
2. Triplet state quenching by triplet dioxygen (i.e., a process of photosensitization) is the most common procedure for the production of singlet molecular dioxygen in solution. For many chemical species, the efficiency with which the triplet state is quenched by triplet dioxygen and, independently, the efficiency with singlet molecular dioxygen is produced, is controlled by the spin-statistical factor.

Source:

PAC, 2007, 79, 293 (*Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006)*) on page 420