Formation of excited metal atoms by direct photolysis and argon photosensitization of carbonyl compounds

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Metal atom emissions are observed when pentacarbonyl iron, tricarbonyl nitrosyl cobalt and tetracarbonyl nickel are irradiated by photons of energy 11.6 - 11.8 eV or are photosensitized by argon. Both excitations lead to the same symmetry for the metal atom but direct photolysis gives only one multiplet state whereas argon photosensitization gives several multiplet states. A single-photon absorption process through a dissociative excited state of the carbonyl compound is invoked to explain the formation of the excited metal atom. Results obtained by collisions of these compounds with metastable argon atoms are compared and discussed.

Site-induced structures in the electronic transitions of naphthalene in rare gas matrixes

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Phosphorescence and $S_1 \leftarrow S_0$ excitation spectra of naphthalene-h_8 and naphthalene-d_8 in argon, krypton and xenon matrixes at 10 K were investigated with medium spectral resolution. The site structures observed in the spectra are dependent on deposition conditions and annealing. The atom–atom potential method was used to model the intermolecular interactions of naphthalene in the ground and excited states with the matrixes. Possible assignments of the site structures are given. The differences observed in the triplet decay constants of naphthalenes in different sites in argon, krypton and xenon support our assignment. Geometrical changes in naphthalene in excited states are important factors determining site splittings.