Charge transfer in Manganese-Phthalocyanine compounds

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Manganese-Phthalocyanine (MnPc) harbors a number of interesting properties, which explains its importance for fundamental as well as more applied research activities. For instance, it is characterized by an unusual S = 3/2 spin state of the Mn^{2+} central ion, MnPc has even been referred to as a typical example of a molecular magnet. Moreover, it shows the smallest ionization potential amongst the transition metal phthalocyanines, and its optical absorption spectrum is far more complex as that of e.g. CuPc.

In this contribution, we will review investigations of charge transfer contributions to the optical absorption data, and the formation of new materials or interfaces based on MnPc, which are characterized by charge transfer reactions. In particular, it is demonstrated that the two energetically lowest absorption features or electronic excitations in bulk MnPc are due to charge transfer excitations, opposite to many other molecular solids where (Frenkel-type) intra-molacular excitations dominate. Further, the formation of MnPc/F_{16}CoPc interfaces is discussed which are characterized by a spin and charge transfer at the interface. Finally, MnPc and the strong electron acceptor F_4TCNQ form a charge transfer (bulk) material in which the MnPc molecules are fully ionized.

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