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Spin Crossover and Valence Tautomerism: Symmetry Aspects

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Deadline for manuscript submissions:
closed (30 April 2023)

Message from the Guest Editors

The development of molecular materials whose physical properties can be manipulated by external stimuli—such as temperature, light, magnetic field, and pressure—has attracted much attention owing to their potential applications in molecular devices. So-called bistable compounds possessing Spin Crossover (SCO) and/or Valence tautomerism (VT) attract attention of chemists and physicists because both phenomena are the ways to alter the physical properties of crystalline materials. VT is a structural isomerism followed by reversible electron transfer between metal centers and redox-active ligands. SCO is a structural isomerism accompanied by the change of spin state of central metal ion. The symmetry of a molecule plays a definite role in determining both the SCO and VT equilibria. Symmetry defines the order of electronic states of isomers between which the transition should occur. The structural symmetry of ligands, meanwhile, determines the degree of degeneration of the electronic states of each isomer.

The present Special Issue is open to contributions related to recent advances in materials and molecular systems related to valent tautomerism.

mdpi.com/si/87893

Special Issue

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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