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Opinion

# Inverse Coordination-The Janus Face of Coordination Chemistry

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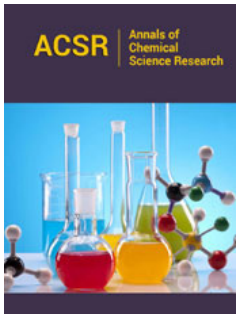


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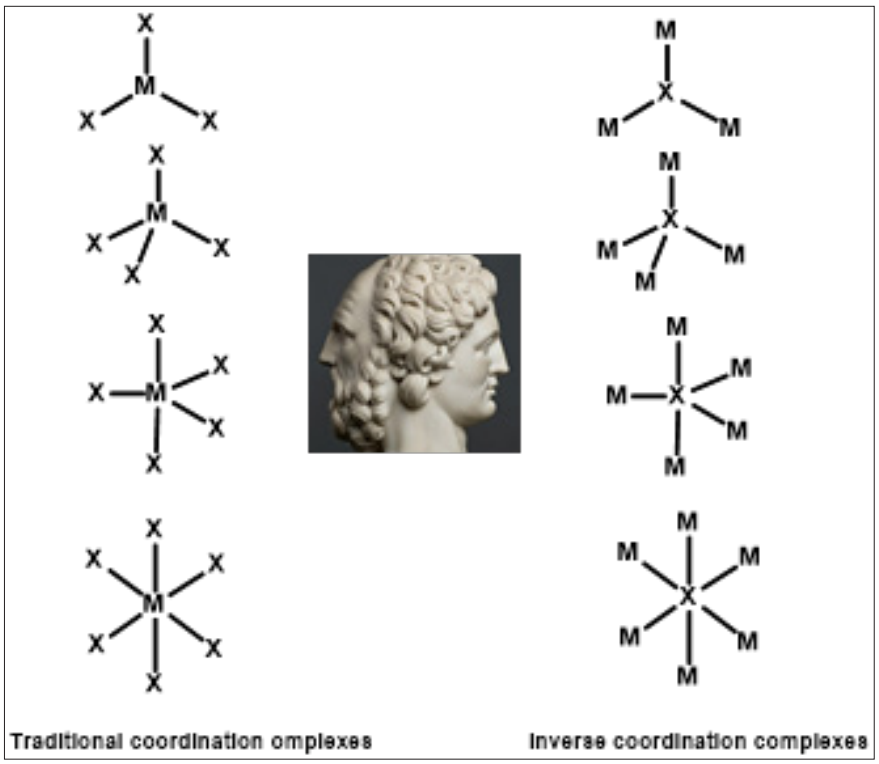
## Opinion

I would like to draw attention to the novel chemical concept of inverse coordination, which discloses another face of coordination chemistry (practically ignored so far as a distinct field) and deals with the formation of metal complexes in which the donor and acceptor positions are reversed. This concept emerged after R.C. Mulvey used the "inverse crown" paradigm [1], to describe macrocyclic structures in which "the arrangement of Lewis acidic [acceptor] and Lewis basic [donor] sites is opposite to that encountered in conventional crown ether complexes". The extension of this paradigm resulted in the "inverse coordination" concept [2]. The inverse coordination can be defined as the formation of metal complexes in which the arrangement of the acceptor and donor sites is opposite to that occurring in conventional coordination complexes [3]. The relationship between traditional coordination complexes and inverse coordination complexes could be regarded as a Janus face image, as suggested by Scheme 1.




**Scheme 1:** A Janus* face relationship between traditional and inverse coordination complexes.
*Janus-Roman god of beginnings and transitions, God of change and time (Wikipedia).

The inverse coordination covers a broad diversity of complexes which can be classified according to the central core, which can be a distinct single atom or a di- or polytopic donor molecule. Several classes of inverse coordination complexes have been reviewed in a book [4] , a general review [5] and several articles, namely dealing with oxygen [3,6], sulfur, selenium [3], halogens [7], nitrogen [8], phosphorus and other pnictogen (arsenic, antimony) [5] single atoms, as well as polytopic exo-donor molecules with oxygen heteroatoms, i.e. oxo-carbons and oxygen heterocycles [9], oxalates and thio and azo analogues [10], nitrogen donor molecules (e.g. five-membered [11] and six-membered [12] nitrogen heterocycles) and inorganic open and cyclic heteroatom molecules [13] as coordination centers. The inverse coordination complexes should be regarded as a distinct chapter within the broad discipline of coordination chemistry.

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