

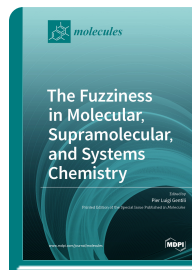
Special Issue Reprint

The Fuzziness in Molecular, Supramolecular, and Systems Chemistry

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Fuzzy Logic is a good model for the human ability to compute words. It is based on the theory of fuzzy set. A fuzzy set is different from a classical set because it breaks the Law of the Excluded Middle. In fact, an item may belong to a fuzzy set and its complement at the same time and with the same or different degree of membership. The degree of membership of an item in a fuzzy set can be any real number included between 0 and 1. This property enables us to deal with all those statements of which truths are a matter of degree. Fuzzy logic plays a relevant role in the field of Artificial Intelligence because it enables decision-making in complex situations, where there are many intertwined variables involved. Traditionally, fuzzy logic is implemented through software on a computer or, even better, through analog electronic circuits. Recently, the idea of using molecules and chemical reactions to process fuzzy logic has been promoted. In fact, the molecular word is fuzzy in its essence. The overlapping of quantum states, on the one hand, and the conformational heterogeneity of large molecules, on the other, enable context-specific functions to emerge in response to changing environmental conditions. Moreover, analog input-output relationships, involving not only electrical but also other physical and chemical variables can be exploited to build fuzzy logic systems. The development of “fuzzy chemical systems” is tracing a new path in the field of artificial intelligence. This new path shows that artificially intelligent systems can be implemented not only through software and electronic circuits but also through solutions of properly chosen chemical compounds. The design of chemical artificial intelligent systems and chemical robots promises to have a significant impact on science, medicine, economy, security and wellbeing. Therefore, it is my great pleasure to announce a Special Issue of Molecules titled “The Fuzziness in Molecular, Supramolecular, and Systems Chemistry.” All those who experience the Fuzziness of the molecular world or use Fuzzy logic to design Chemical Complex Systems will be interested in this book.



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