

Overview of the electronic structure of polymer materials for polymer-based electronics

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In developing a materials science database in support of molecular and polymeric electronics, the electronic structure of the conjugated materials of interest is of paramount importance. Various methods may be used to explore details of the electronic structure, but none are universal. Starting over two decades ago, ultraviolet photoelectron spectroscopy has proved to be among the most useful. The usefulness of this method depends upon a close interplay between experiment and theory. The evolution of UPS following advances in new materials synthesis will be outlined. Some examples of the application of a combined experimental-theoretical approach to the use of UPS to reveal certain central details of the electronic structure of conjugated materials of current interest will be discussed. The one-dimensional nature of polymer chains, and the consequences for interfaces of polymer films at hybrid interfaces will be pointed out in the examples.