Elecron microscopy for organic molecules

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There is an awareness among scientists and technologists that organic materials offer considerable potential for application in many diverse areas. Recent advances in organic materials are found in electrically conducting materials, superconductors, non-linear optical materials, organic electroluminescence devises, organic solar cells, organic field-effect transistors (FETs) and single molecular electronic devises. In these innovations, novel system performance could be recognized through nanostructuring as well as molecular property itself.

As the dimensions of the structures approach the nanometer level, it becomes increasingly important to characterize materials properties at nanometer scale. Much of information on such nanoscale phases is being obtained by electron microscopy and this method is also an area of rapid progress. In the presentation, structural aspects of nanoscale phases in organized organic materials will be discussed in relation with their properties, in which the organized phases were analyzed using various recent techniques in electron microscopy; STEM, Cryo-TEM, EELS and electron crystallography. The combination of various techniques of electron microscopy is the most important in structural and electronic states analyses of organic materials as being demonstrated typically in dye sensitized solar cells and organic FETs as well as other functional organic materials.