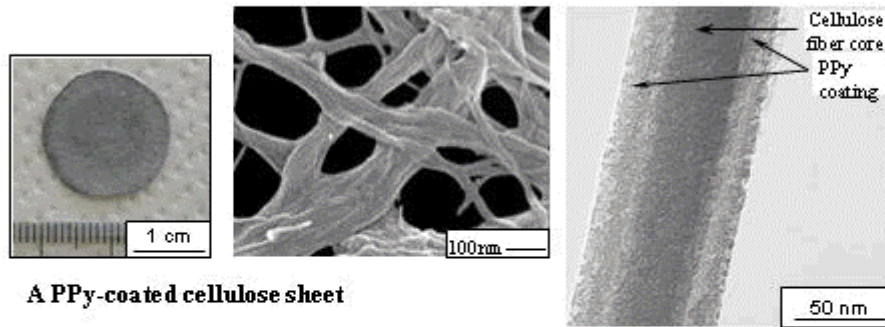
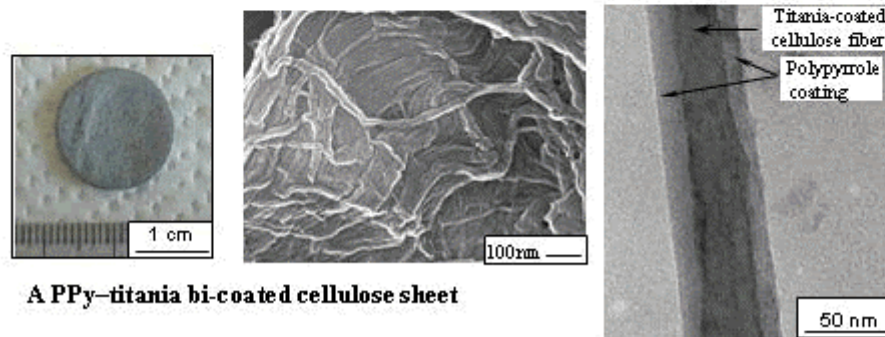


# Hierarchical Polypyrrole Composite Materials

Cellulose is a natural linear polymer, natural cellulosic substances, such as commonly used filter paper, have unique morphological hierarchies in a range from millimeter to nanometer scales. Ultrathin layer of polypyrrole (PPy) can be precisely deposited on each cellulose microfibril of filter paper by means of the polymerization-induced adsorption. The current methodology offers great flexibility in structural, morphological, and functional designs of conducting polymer nanocomposite materials. Combining the rich varieties of natural substances, conducting polymers, and metal oxides, various functional hierarchical nanocomposites with tailored properties can be produced.



**A PPy-coated cellulose sheet**



**A PPy-titania bi-coated cellulose sheet**