Enhancements of Mechanical Properties of Self-assembled Nanofibrillar Composite Films and their Applications

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Nanomaterials and nanostructures have been adapted to the fabrication of daily-life electronic devices. However, importance of the device integrity, especially in the viewpoint of mechanical strength and stability, have been underestimated. In this presentation, we would like to address how anisotropic nanofibers could improve mechanical properties of the nanocomposites. Mechanical stretching methods are utilized to align assembled nanofibers in strain directions. The alignments of the nanofibrils are effective to enhance stiffness and mechanical strength. In addition, solvent swelled nanocomposites, for instance with ionic liquid, present superb combination of stiffness and damping property, that is impossible to achieve with conventionally engineered composites. Also an example of the electrochemical application with nanofibril-based nanocomposites will be introduced at last.