

Nanostructured Supramolecular Liquid-Crystalline Assemblies

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Liquid crystal is one of soft materials that shows combined properties of order and dynamics. Ordered supramolecular assemblies of functional molecules can induce anisotropic or enhanced functions [1]. Herein we describe some of our recent approaches to the functionalization of nanostructured supramolecular liquid-crystalline (LC) assemblies [2,3]. Supramolecular LC assemblies composed of mechanically interlocked molecules such as rotaxanes and catenanes [2] are expected to form dynamically functional assemblies. The LC rotaxane exhibiting redox-driven switching has been prepared [2a]. We have also developed stimuli-responsive liquid crystals that exhibit mechanically or thermally induced changes of photoluminescent colors [3]. Anisotropic and enhanced dynamic functions are induced by the incorporation of photo-, electro-, and ion-active moieties into nanostructured supramolecular LC assemblies.

References

- [1] a) T. Kato, N. Mizoshita, K. Kishimoto, *Angew. Chem. Int. Ed.* **2006**, *45*, 38; b) T. Kato, *Science* **2002**, *295*, 2414; c) T. Kato, T. Yasuda, Y. Kamikawa, M. Yoshio, *Chem. Commun.* **2009**, 729.
- [2] a) I. Aprahamian, T. Yasuda, T. Ikeda, S. Saha, W. R. Dichtel, K. Isoda, T. Kato, J. F. Stoddart, *Angew. Chem. Int. Ed.* **2007**, *46*, 4675; b) E. D. Baranoff, J. Voignier, T. Yasuda, V. Heitz, J.-P. Sauvage, T. Kato, *Angew. Chem. Int. Ed.* **2007**, *46*, 4680.
- [3] Y. Sagara, T. Kato, *Angew. Chem. Int. Ed.* **2008**, *47*, 5175; *Adv. Funct. Mater.* **2009**, *19*, 1869; *Chem. Commun.* **2009**, 3597.