# E-field Modulation of Molecular Assemblies and Functions by Engineering Electrostatic Interactions

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Electrostatic interaction is one of the most important non-covalent forces, which plays an important role in organic molecules not only to control their reactivities and assembling behaviors but also to their functions and properties. Generally, electrostatic interactions between molecules could be modulated only by changing the molecular structures. On the other hand, our study aims to realize an external modulation of electrostatic interactions by electric-field (E-field) for perturbing molecular assemblies and functions for developing unique materials. Based approach, we have developed, (a) biomimetic E-field responsive self-assembled monolayers,[1] (b) E-field responsive cholesteric liquid crystals for reflective displays,[2,3] and (c) E-field responsive columnar liquid crystals for multi-responsive soft materials.[4,5,6] In this presentation, I would like to share how this simple and intuitive approach can lead to the realization of novel functional materials.

[1] *Science*, **2015**, *348*, 555. [2] *Adv. Mater.* **2016**, *28*, 4077. [3] *J. Am. Chem. Soc.* **2018**, *140*, 10946. [4] *J. Am. Chem. Soc.* **2011**, *133*, 13767. [5] *Science* **2019**, 363, 161. [6] *J. Am. Chem. Soc.* **2019**, *141*, 10033.