

Solvent-free Liquid π -Conjugated Molecules via Alkyl-Engineering

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Our recent research interest is to develop novel ultimate-soft organic materials, i.e., room-temperature π -conjugated molecular unit bearing bulky, flexible, low-melting branched alkyl chains (Figure 1). There are no charged units on the molecule, thus FMLs show a clear contrast with ionic liquids (ILs) in terms of functions in their liquid form. The studies of multi-color tunable luminescent liquids based on blue-color emitting, electron-donor type liquids^{1,2)} and uncommon phase phenomena with the photoconducting property of liquid fullerenes³⁾ are designed simply by controlling a balance of intermolecular interactions in the alkyl-

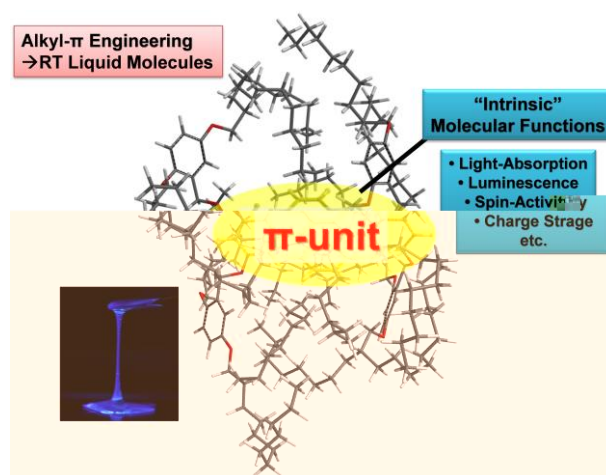


Fig. 1. A schematic drawing of alkyl-molecular liquids and a photograph of typical blue emitting liquid.

Here, the molecular design principle of FMLs based on an alkylated- π -unit molecular component described in this paper will be naphthalene⁵⁾, anthracene^{2,6)}, pyrene⁷⁾, porphyrin⁸⁾, phthalocyanine⁹⁾, and fullerene³⁾. The latest our attempt such as development of stretchable liquid also discussed in the presentation.

References

- 1) *Angew. Chem. Int. Ed.*, **2012**, 51, 3391-3395. (Highlighted in *Nature*, **2012**, 484, 9.); 2) *Nature Commun.*, **2013**, 4, 1969.; 3) *Nature Chem.*, **2014**, 6, 690-696.; 4) *Chem. Commun.*, **2017**, 53, 10344-10357. (Feature Article); 5) *Phys. Chem. Chem. Phys.*, **2018**, 20, 2970-2975.; 6) *Chem. Sci.*, **2018**, 9, 6674; 7) *Sci. Rep.*, **2017**, 7, 3416.; 8) Patent Applied, 2017-124302.; 9) *Chem. Asian J.*, **2018**, 13, 770-774.