Highly condensed π–gels based on chiral alkyl–π molecular liquids as a medium

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In recent years, with increasing interest in soft organic materials, fluidic and non-volatile functional liquid materials have attracted attention. By modifying a π-conjugated unit with bulky yet flexible branched alkyl chains, solvent-free functional liquids (alkyl–π liquids) have been developed[1]. Since it is necessary to adjust the elastic modulus (*G*') over a wide range to expand the usefulness of alkyl–π liquids, we have developed new functional gel materials based on alkyl–π liquids by employing low-molecular-weight gelators.[2] The effect of the chirality on the physicochemical properties of alkyl–π liquids and their gelated materials remains largely unexplored. This study focuses on the effect of chirality for both alkyl–π liquid and low-molecular-weight gelator towards the gelation and optoelectronic properties.

In this presentation, we mainly utilize blue-fluorescent liquid carbazoles possessing a racemic (***rac*-CZL**)[3] or a (*R*)-isomeric (***R*-CZL**) branched alkyl chain (Fig. 1a). These exhibited different phase transition behaviors. As gelators, (*R,R*)- and (*S,S*)-isomer containing amide units for intermolecular hydrogen bonding (***RR*-GA** and ***SS*-GA**)[4] (Fig. 1b) were employed. By investigating the rheological and optical properties of the gels of ***rac*-CZL** or ***R*-CZL** using ***RR*-GA** or ***SS*-GA** (Fig. 2), we discuss the effect of chirality on the formation process of gelator's fibrous assemblies and on the viscoelastic and optical properties.

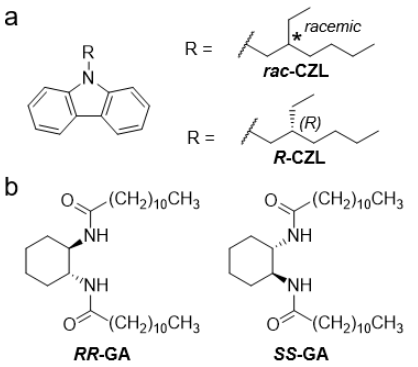

Fig. 1 Molecular structures of (a) liquid carbazoles ***rac*-CZL** and ***R*-CZL**, (b) gelators ***RR*-GA** and ***SS*-GA**.

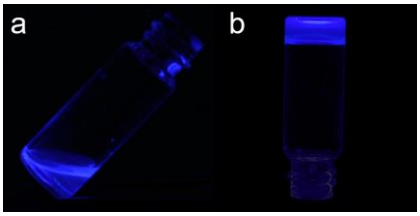

Fig. 2 Images of (a) neat liquid ***R*-CZL**, and (b) gel ***R*-CZL** with 1 wt% gelator ***RR*-GA**, under 365 nm UV irradiation.

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