

論文名 : Study of twin-head type steroidal derivative organo-gelators and its applications
(要約)

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Twin-head type steroidal derivatives which have various chemical structures were synthesized by one step of simple synthetic method as novel low molecular-weight organo-gelators, which possessed excellent gel abilities, various molecular aggregates, and unique gelation behaviors. For cholesteryl hydrogen succinate (CHS)/normal aliphatic diamine (C_n -diamine, $n = 2-12$) complex salts, since the ionic bonds between carboxylic groups and amino groups in complex salts form immediately, an organogel can be easily obtained only by mixing CHS benzene solution and C_n -diamine benzene solution. The organogels of CHS/ C_n -diamine complex salts showed thermally reversible and thixotropic sol-gel transition behaviors. Three types of Cholesteryl hydrogen phthalate (CHP)/ C_6 -diamine complex salts using *o*-, *m*-, and *p*-type CHP acted as gelator for some organic fluids. The shape of complex salts also has an influence on the morphologies of assembly. CHS normal aliphatic diamide (CHS C_n -diamide, $n = 2-12$) compounds readily formed thermoreversible gels with various organic fluids. A selection chart for a novel gel composite material was made based on the gelation data obtained. Organogels containing polyaniline (PANI) were prepared and characterized. PANI-toluene gels showed thermal reversibility and thixotropic behavior. Using the ballpoint pen refill filled PANI-toluene gel, lines were successfully produced similar to the ones produced by regular ballpoint pen. “Dried” PANI gel (PANI concentration is 90 % (w/w)) showed electrical conductivity similar to the neat PANI’s. PANI-rGO organogels and PANI-rGO composites *via* initial organogels were prepared and characterized by simple method. PANI-rGO gels showed thixotropic behavior and electrical conductivity, $2.5 \times 10^{-5} \text{ S cm}^{-1}$. “Dried” PANI-rGO composites *via* organogels showed 3.2 S cm^{-1} conductivity. Hyaluronic acid (HA) organogel was prepared by mixing HA aq. and organogel. Poly methylmethacrylate (PMMA) was polymerized in the organogel without collapsing its gel structure. As described above, twin-head type steroidal derivative’s organo-gels and their composite organo-gels are prepared by simple methods. The gel composite materials would be applicable to practical application and industrialization of organic electric materials. The simple and speedy development method of novel molecular gel composite materials would contribute to gel application in various field.