Chiral and fluorescent supramolecular gels: study of properties and insights into applications

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Supramolecular gels based on imidazolium salts represent a highly promising class of materials for their gelling ability, emission properties and biological response. These materials find application in different fields such as bioimaging [1] or drug delivery [2]. In this work, we obtain supramolecular gels from salts that have an imidazolium 1,8-naphthalimide-based cation and anion derived from L-amino acid, in a 7:3 mixture of aqueous buffer Tris/DMSO. 1,8-Naphthalimide is a widely used fluorescent chromophore because it can be easily modified with a variety of functional groups and exhibts strong absorption and fluorescence response [3]. For each gel, we determined the critical gelation concentration (CGC) and gel-sol transition temperature (T_{gel}). Resonance light scattering (RLS) kinetics were carried out to evaluate gelation time and aggregates size, while SEM images of xerogel were used to study the gel morphology. We investigated the aggregation behaviour in solution using absorbance and emission measurements to identify the nature of aggregates and assess its impact on emission properties.

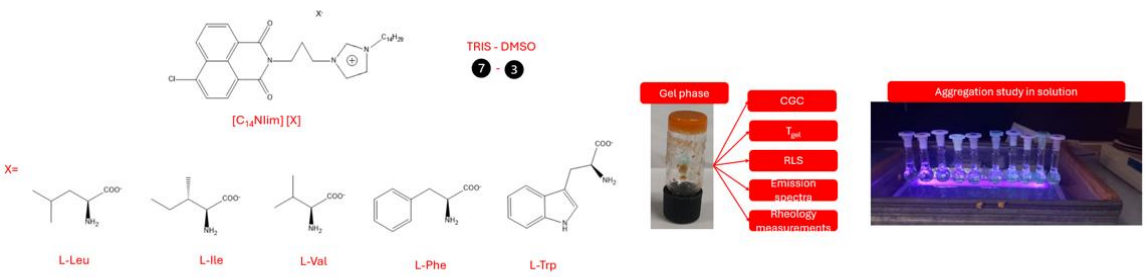

Figure 1. Structures of salts used as gelators and different type of characterizations.

The results reveal that salt with aromatic anions gel at lower concentrations than those with aliphatic anions. In particular, the gel formed by the salt with L-Tryptophane (L-Trp) exhibits the highest thermal stability and, according to RLS measurements,, forms larger aggregates compared to the other systems. The gelators used also show promising applications as bioimaging and antiproliferative agents.

References

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