**Subcritical water processing for fluorescent organic nanodots**

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**Abstract**

Fluorescent nanomaterials have received intense scientific attention and offer promising applications from molecular sensors through cancer diagnosis agents to optoelectronic devices. Aggregation-induced emission (AIE), which effect is exactly opposite to the notorious ACQ (aggregation-caused quenching), are among the most attractive of fluorescent nanomaterials, offering possibility with any concentration for bioassays in the use of dye solutions. However, most AIE materials, such as hexaphenylsilole (HPS), are soluble in toxic organic solvents (e.g. tetrahydrofuran), and insoluble in green solvents (such as water), which limited the further application of biological applications. The high pressure reactors widely used in supercritical/subcritical fluid technique, can generate subcritical water (SBCW) referring to liquid water with pressure in the temperature range of 373.15 K to 647.15 K, which can be used as the solvent to eliminate the use of organic solvents and provide a green route to synthesize fluorescent nanomaterials. In this work, we reported a green process for the synthesis of AIE fluorescent nanoparticles via solvent anti-solvent precipitation, in which the SBCW and cold water were used as the solvent and anti-solvent respectively. The obtained AIE fluorescent organic nanodots showed an average size less than 10 nm with uniform distribution, and exhibited good optical performance and well-dispersion in aqueous solution. The use of SBCW as the solvent overcomes the limitations of using toxic organic solvents during solvent anti-solvent precipitation, offering a green method of manufacturing AIE fluorescent nanoparticles, as well as other poor water soluble fluorescent nanomaterials, and it is also more convenient for real-time monitoring of the temperature and pressure in the reaction system and more reliable for scalable mass-production.