Intrinsically Dual-Emissive Organic Nanoparticles Prepared by Air Oxidation of Aminoquinoline Derivatives

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The development of multicolor fluorophores has been one of the great challenges for their various fields of applications such as cell counting/sorting, diagnostics, therapeutics, and optoelectronics. In this report, we have synthesized intrinsically dual-emissive organic nanoparticles (ONs) via air oxidation of a series of single-molecular aminoquinoline derivatives. Our ONs show two distinct emissions at around 450 and 500 nm, which could be assigned respectively to the polycyclic-carbon-centered π-π* transitions and the pyridine-centered n-π* transitions. The related mechanism has been thoroughly studied by the Stern-Volmer quenching analysis and time-resolved photoluminescence spectroscopy. Finally, we fabricate color-converting films employing ONs to emit two different colors depending on the control wavelength. Our findings provide a pathway for the design of multicolor fluorophores for various optical and biomedical applications.