Multi color response colloidal photonic crystal(CPC) particles with structural core-shell domain

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Colloidal photonic crystal(CPC) is one of the promising encryption tool through colorization by Bragg refraction. Ordered colloidal lattice selectively reflects visible wavelength when a lattice spacing is satisfied in specific range. Here, we fabricated spherical type of core-shell CPC particles which have different lattice characteristic domain to obtain multi-color response. Multi-color response in core-shell domain is beneficial for flexibility of information transfer as well as complexity of encoding. Using microfluidic system, spherical type of CPC particles with uniform lattice spacing can be fabricated from W/O/W double emulsion. When oil phase is removed, structural transition of CPC is entailed by movement of water molecules in the CPC particle. As a result, compact packed shell and hydrated core is separated which shows blue- and red-shifted structural color and reflective intensity peak respectively. Structural stability of CPC is retained by hydrogen bonding and entanglement of polyvinylpyrrolidone molecules on colloidal nanoparticles.