Synthesis of π-expanded aromatic compounds using precursor approach for organic electronic materials

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Pristine π-extended aromatic compounds are attractive as organic functional materials, including organic semiconductors, but are difficult to synthesize in pure form due to their low solubility in common organic solvents. We have developed a precursor approach as a method to synthesize pure low-soluble π-extended aromatic compounds. In this approach, soluble precursors are first prepared and purified, then are converted quantitatively to the target molecules via retro-Diels–Alder reactions or Strating–Zwanenburg photodecarbonylation reactions. This approach is also effective for the on-surface synthesis of the large acenes like heptacene and nonacene under ultra-high vacuum. Tetrabenzorpohyrins are one of the promising organic semiconductors. The charge carrier mobilities of tetrabenzorporphyrins as organic field effect transistors have been improved using the precursor approach in combination with substituent effects. In this talk, I would like to focus on our recent results on the synthesis and morphological control of π-extended aromatic compounds for organic electronic materials using the precursor approach.