

## New Molecular Architectures of Copper Imidazoles and Triazolates

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We recently exploited simple exo-bidentate and exo-tridentate ligands such as imidazoles and triazolates to generate a number of copper coordination polymers. Copper(I) cations can be conveniently generated from the hydrothermal treatments of copper(II) salts with organic ligands. A metal valence tuning approach with pH and temperature control has been utilized to generate a series of new mixed-valence Cu<sup>I</sup>/Cu<sup>II</sup> imidazolate polymers exhibiting different Cu<sup>I</sup>/Cu<sup>II</sup> ratios and topologic structures. More interestingly, using appropriate organic templates, we could also isolate a series of molecular polygons, namely octagons [Cu<sub>8</sub>(mim)<sub>8</sub>] and decagons [Cu<sub>10</sub>(mim)<sub>10</sub>]. We also found that 1,2,4-triazolates can also be prepared by hydrothermal treatments of organonitriles and ammonia in the presence of copper(II) salts. Two new 3-connected 3D networks Cu(mtz) and Cu(ptz) exhibit novel 4.8.16 and 4.12<sup>2</sup> nets. A pre-designed metal-organic building block Cu(2-pytz) offers unusual supramolecular isomers upon variations of the reaction condition.

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