Odd-even Alternation in Tautomeric Porous Organic Cages with Exceptional Chemical Stability

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Amine-linked (C-NH) porous organic cages (POCs) are preferred over the imine-linked (C=N) POCs due to their enhanced chemical stability. In general, amine linked cages, obtained by the reduction of corresponding imines are not shape-persistent in the crystalline form. Moreover, they require multi-step synthesis. Herein, we report a “one-pot” synthesis of four new amine linked organic cages by the reaction of 1,3,5-triformylphloroglucinol (Tp) with different analogues of alkanediamine. The POCs resulting from the odd diamine (having odd no. of –CH2 groups) is conformationally eclipsed while the POCs constructed from even diamines (having even no. of –CH2 groups) adopt a gauche conformation. This odd-even alternation in the conformation of POCs has been supported by computational calculations. The synthetic strategy hinges on the concept of Schiff base condensation reaction followed by keto–enol tautomerization. This mechanism is the key for the exceptional chemical stability of cages and facilitates their resistance towards acids & bases.