Oral Contributions

[MS25 - 02] Purely Organic Frameworks
Self-Assembled via Orthogonal Hydrogen
and Halogen Bonding. Giancarlo Terraneo,
Luca Colombo, Gabriella Cavallo, Pierangelo
Metrangolo, Tullio Pilati, Giuseppe Resnati.

NFMLab, Department of Chemistry, Materials,
and Chemical Engineering “Giulio Natta”,
Politecnico di Milano, via L. Mancinelli 7,
I-20131 Milan, Italy.
E-mail: giancarlo.terraneo@polimi.it

The last two decades have seen a growing interest
in the field of metal-organic frameworks (MOFs) [1],
crystalline materials composed of self-assembled
organic ligands and metal cations. The strength and
directionality of coordination bonds allowed the
design and the obtainment of a number of tuneable,
porous and robust materials. Following the same
self-assembly approach, a smart use of supramolecular
interactions, recently enabled the obtainment of
metal-free purely organic frameworks. The intrinsic
flexibility of the connections involved in the
network formation allowed the realization of
responsive materials with applications in fields
like as gas adsorption [2], conductivity [3] and
molecular transport [4]. Halogen bonding (XB)
is a powerful tool in supramolecular chemistry
[5], often seen in competition with the most
commonly used hydrogen bond (HB). Here we
show that it is possible to use XBs and HBs in a
cooperative way for the construction of purely organic frameworks.[6] Two new ligands
(meso and rac-4,4’-[1,2-bis(2,3,5,6-tetrafluoro-
4-iodophenoxy)ethane-1,2-diyl]dipyridine) able
to be involved in both XB and HB has been
designed and synthesized. Using the selected
ligands several purely organic open frameworks
with different topologies were synthesized via XB
and HB orthogonal self-assembly. Remarkably in
all the obtained networks large voids are present,
filled with solvent molecules. The robustness of
the networks and the accessibility of these spaces
have been demonstrated in one case via single
crystal-to-single-crystal (SCSC) guest exchange
from liquid and gas phases.

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