

## Toughening of epoxy resin using $Zn_4O$ (1,4-benzenedicarboxylate)<sub>3</sub> metal organic framework

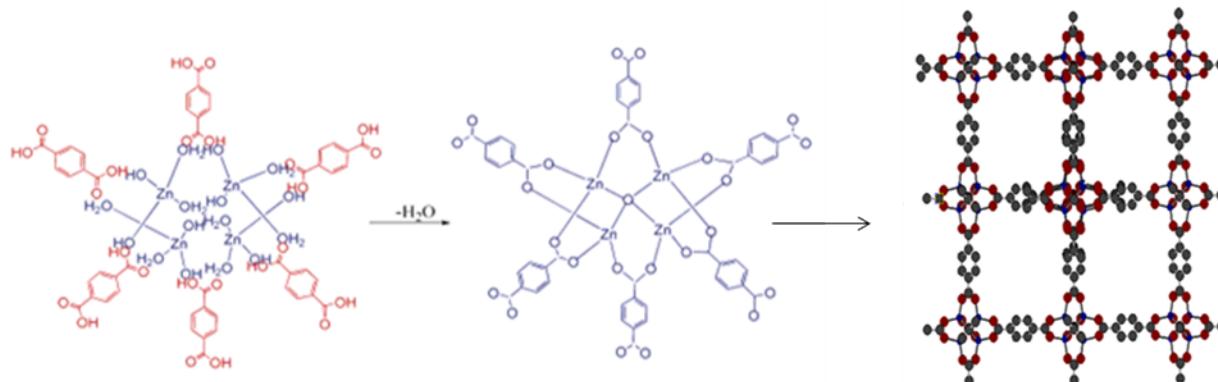
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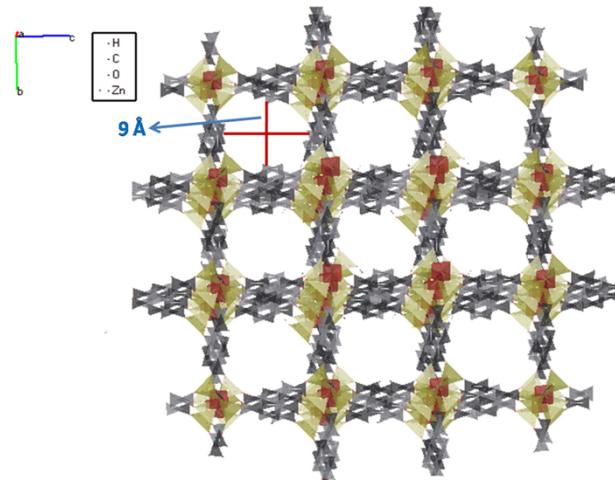
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### Supramolecular assembly of MOF 5

The scheme showing the formation of secondary building unit of MOF 5 is presented below, which further combines with terephthalic acid to form a three dimensional network.



In brief, separate solution of TPA (5.06 g, 30.5 mmol) and zinc acetate dihydrate (16.99 g, 77.4 mmol) were prepared in DMF, which were mixed and allowed to react for 2.5 h under stirring. The resulting crystallites were filtered, washed repeatedly with DMF and stored under desiccation.



**Figure S1: 3D image of MOF 5 showing the pore size of 0.9 nm**

**Table S1:** Compositional details of the samples prepared

Sample	Amount		
designation	Epoxy (g)	Hardener (g)	MOF 5 (mg)
EP	100	13	-
EP1MOF	100	13	113
EP3MOF	100	13	339
EP5MOF	100	13	565
EP7MOF	100	13	791

#### ***Numerical Modelling of blast loaded concrete slabs***

The slab model of the retrofitted concrete is shown in [Fig. S1](#). The target structure (270 cm x 100 cm x 30 cm) is constructed of laced reinforced concrete (LRC) retrofitted with a 6 mm thick layer of epoxy composite (EP3MOF). The slab is supported on two pendine blocks of high strength concrete and the structure is subjected to blast load resulting from an explosion

of 27.2 kg of TNT (net explosive content of 4 anti-tank land mines), at a standoff distance of 1 m. This scenario is representative of an open air burst which generates a peak pressure of 35 bars with a positive duration of 1 ms. The real time deformation, in terms of the structural response of the slab is shown in Fig. S2.

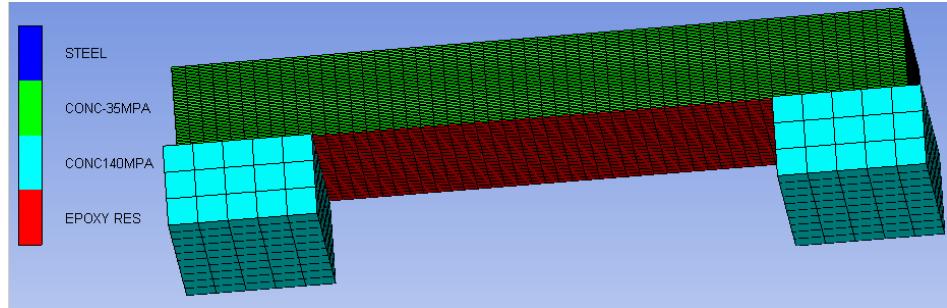


Figure S2: Slab model of retrofitted concrete

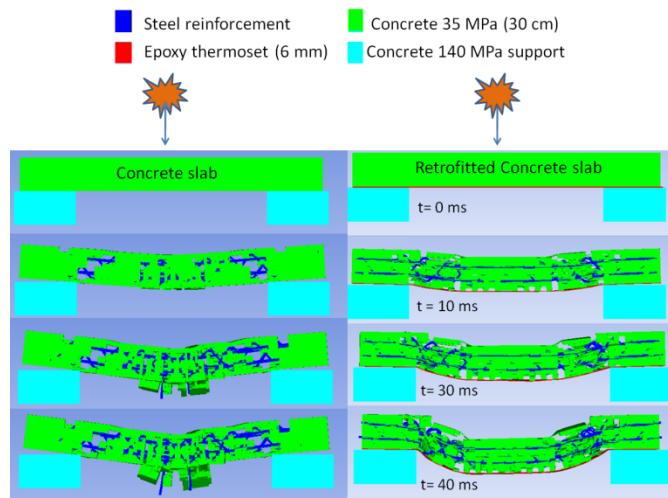


Figure S3: Blast induced deformation-time history in concrete and retrofitted concrete slabs