

We Claim:

1. A Covalent Organic Framework comprising of plurality of 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde and plurality of terphenylamine, s-tetrazinedianiline, s-tetrazine bispyridines in an extended layered covalent framework.
- 5 2. The covalent organic framework as claimed in claim 1, wherein the terphenylamine is (1,1':4',1''-terphenyl)-4,4''-diamine, s-tetrazinedianiline is 4,4'-(1,2,4,5-tetrazine-3,6-diyl)dianiline, and the s-tetrazine bispyridines is 5,5'-(1,2,4,5-tetrazine-3,6-diyl)bis(pyridin-2-amine).
- 10 3. The covalent organic framework as claimed in claim 1, wherein the covalent organic framework is based on 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde and (1,1':4',1''-terphenyl)-4,4''-diamine; 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde and 4,4'-(1,2,4,5-tetrazine-3,6-diyl)dianiline; and 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde and 5,5'-(1,2,4,5-tetrazine-3,6-diyl)bis(pyridin-2-amine).
- 15 4. The covalent organic framework as claimed in claim 1, wherein the covalent organic framework is selected from IISERP-COF16, IISERP-COF17 and IISERP-COF18.
- 20 5. A method of preparation of a covalent organic framework comprising the steps of:
 - (a) reacting 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde with terphenylamine, or s-tetrazinedianiline, or s-tetrazine bispyridines in a solvent in presence of acetic acid at a temperature in the range of 120°C to 140°C for a time period of 2 days to 7 days;
 - 25 (b) cooling the reaction mixture to room temperature to obtain a crude product; and
 - (c) optionally purifying the crude product using Soxhlet extraction to obtain the covalent organic framework.
- 30 6. The method as claimed in claim 5, wherein the solvent is selected from dioxane, mesitylene, tetrahydrofuran, dimethylformamide, acetonitrile, ethyl acetate or a mixture thereof.

7. The method as claimed in claim 5, wherein the time period of the reaction of step (a) is 5 days.
8. A covalent organic framework derived Na-ion battery electrode comprising of the
5 covalent organic frame work as claimed in any one of the claims 1 to 4 coated with Na metal.
9. The covalent organic framework derived Na-ion battery electrode as claimed in claim 8, wherein the covalent organic framework is 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde and 5,5'-(1,2,4,5-tetrazine-3,6-diyl)bis(pyridin-2-amine).
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10. The covalent organic framework derived Na-ion battery electrode as claimed in claim 8, wherein the covalent organic framework is IISERP-COF18.
11. A method of preparation of a covalent organic framework derived Na-ion battery
15 electrode, wherein the method comprising the step of:
- (a) dispersing a covalent organic framework in ethanol to obtain ethanolic dispersion of the covalent organic framework;
 - (b) coating the ethanolic dispersion of the covalent organic framework on a carbon paper; and
 - 20 (c) drying the carbon paper in vacuum for 12-24 hours to obtain electrode; and
 - (d) fabricating the electrode using Na metal to obtain the covalent organic framework derived Na-ion battery electrode.
 - (e)
12. The method as claimed in claim 11, wherein the carbon paper is carbon coated
25 aluminium foil.