Supporting Information

Preparation and Engineering of Oriented 2D Covalent Organic Framework Thin Films

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Fig. S1 SEM image of the as-synthesized DAB-TFP COF powder.



Fig. S2 XRD patterns of DAB-TFP COF powder obtained with different volumes of 3M acetic acid. [Other reaction parameters: TFP (10.5 mg), DAB (8 mg), anhydrous 1,4-dioxane (5 ml), mesitylene (5 ml), 120° C, and 3 days.]



Fig. S3 Top-view (up) and cross-sectional (down) SEM images of DAB-TFP COF thin films obtained with different volumes of 3M acetic acid. [Other reaction parameters: TFP (10.5 mg), DAB (8 mg), anhydrous 1,4-dioxane (5 ml), mesitylene (5 ml), 120° C, and 3 days.]



Fig. S4 XRD patterns of DAB-TFP COF powder obtained with different reaction time. [Other reaction parameters: TFP (10.5 mg), DAB (8 mg), anhydrous 1,4-dioxane (5 ml), mesitylene (5 ml), 3M acetic acid (0.2 ml), and 120° C.]



Fig. S5 Top-view (up) and cross-sectional (down) SEM images of DAB-TFP COF thin films obtained with different reaction time. [Other reaction parameters: TFP (10.5 mg), DAB (8 mg), anhydrous 1,4-dioxane (5 ml), mesitylene (5 ml), 3M acetic acid (0.2 ml), and 120° C.]



Fig. S6 FT-IR spectra of DAB, TFP, and powder and thin film of DAB-TFP COF.



Fig. S7 TGA analysis of DAB-TFP COF powder in nitrogen atmosphere.



Fig. S8 Pore size distribution of DAB-TFP COF powder.



Fig. S9 Cross-sectional SEM image of two-cycle grown film of DAB-TFP COF on ITO substrate.



Fig. S10 GID pattern of DAB-TFP COF thin film grown on ITO.



Fig. S11 Top-view (left) and cross-sectional (right) SEM images of DAB-TFP COF films grown on FTO (up) and Si (down) substrates.



Fig. S12 EDX image of 120 nm Pt / DAB-TFP COF stack multilayer.



Fig. S13 Top-view (left) and cross-sectional (right) SEM images of 20nm Pt / DAB-TFP COF stack multilayer.



Fig. S14 EDX image of 20nm Pt / DAB-TFP COF stack multilayer.



Fig. S15 XRD pattern of 20nm Pt / DAB-TFP COF stack multilayer.