

2D Materials based on Covalent Organic Frameworks

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Abstract

Rational design of Covalent Organic Frameworks (COFs) is an emerging subject with potential implications from basic to applied sciences.¹ These porous materials are constructed by assembling organic building blocks, containing diverse functionalities, by strong covalent bonds. Thus, for COF based materials are envisioned diverse applications, such as gas storage, adsorption, optoelectronics and catalysis. However, current synthetic methods, together with COFs' limited processability, restrict massive production and applications.

In this talk, I will summarize our most recent results on liquid phase exfoliation of several types of COFs to isolated few layers. I will focus on different COFs going from well-known boronate ester-linked networks² to polyacetylenic porous³ and polyimines layered organic frameworks. I will show a simple procedure to produce laminar imine-based COFs with interesting physico-chemical properties.⁴ Different procedures to process and structure these materials as very stable gels (xerogels, aerogels,..) and transparent films will be presented. Finally, I will show some possibilities to pattern these materials on several substrates using ink-jet printer and wet lithography techniques.

References

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