IL@PZS Nanocomposites as Catalysts for CO_2 Conversion

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Cyclomatrix polyphosphazenes (PZS) can be readily synthesized through precipitation polymerization,[1] and serves as a host of nanocomposites due to their large pores and electron-rich environment.[2] Ionic liquids (ILs) are composed of ion pairs of which the anion catalyzes the cycloaddition reaction of carbon dioxide (CO_2) with epoxides.[3] CO_2 is an abundant and renewable C1 building block for the synthesis of value-added carbonates/polycarbonates.[4] Herein, we developed IL and PZS nanocomposites (IL@PZS) and applied them for CO_2 conversion.

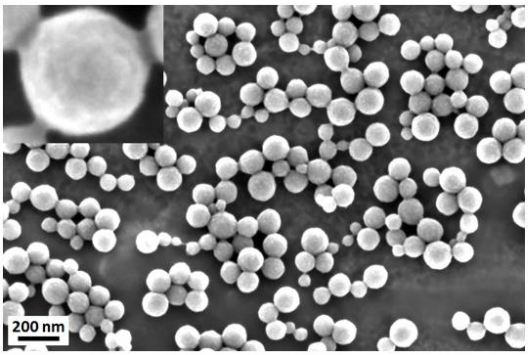

Figure 1. SEM of PZS nanophseres.

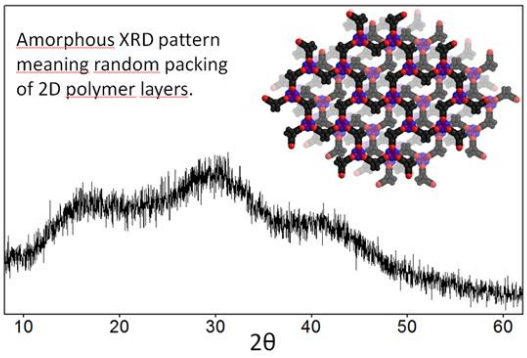

Figure 2. Powder X-ray diffraction of PZS nanophseres.

The yields of styrene carbonate are dramatically increased compared to that using only ILs as catalysts. The catalytic activity of the IL@PZS nanocomposites depends on structure matchability between the ILs and the PZS.

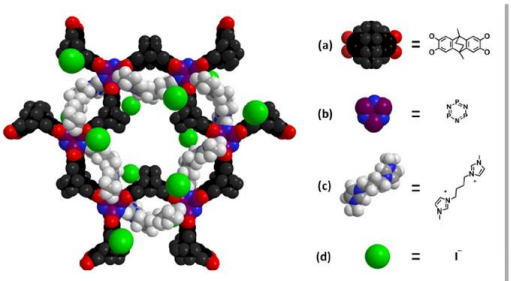

Figure 3. A typical IL@PZS nanocomposite.

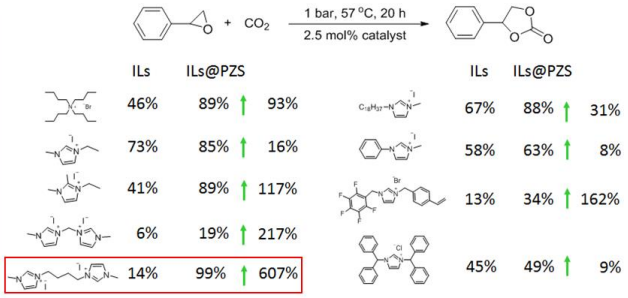

Figure 4. Catalysis comparison for CO2 conversion.

[1] Huang Z., Chen S., Lu X., Lu Q., Chem. Commun. 2015, 51, 8373.
[2] Mohanty P., Kull L. D., Landskron K., *Nat. Commun.*, **2011**, *2*, 401.
[3] Sun Q., Aguila, B., Perman J., Nguyen N., Ma S., *J. Am. Chem. Soc.*, **2016**, 138, 15790.
[4] Bobbink F. D., Dyson P. J., *J. Catal.*, **2016**, *343*, 52.