In view of the current severe environmental problems, in addition to strictly control and reduce the emissions of greenhouse gas CO2, for a lot of CO2 that have emitted, it is no way that can completely meet many requirements such as low cost, large-scale preparation, high efficiency, environmental protection and so on.

The global annual CO2 emissions is about 30 billion tons, and about 20% of them are consumed by marine plankton diatoms through the photosynthesis [1]. As the CO2 concentration in water is very low, while diatoms have evolved an efficient CO2 capture mechanism, that is to transform negative charge HCO3¯ in water into CO2 by carbonic anhydrase (CA) and send them into the cell[2-3]. After diatoms died the enzyme loss its activity, and the biological CO2 capture process stops.

Using porous coordination polymer such as MOFs, ZIFs and COFs to simulate the function of biological eCA in diatoms in this research, assembled porous coordination polymer which can adsorp CO2 itself on the cell wall of diatomite, trying to make dead diatoms to regain the ability to capture CO2, trying to make hundreds of millions of tons of dead algae “coming back to life” on the function of the adsorption of CO2, and make waste profitable. Through the recombination between porous coordination polymer and the Diatomite, Prepared a variety of porous coordination polymer/ Diatomite composite with high CO2 capture and catalytic conversion performance, low cost and large-scale production, and the Diatomite regain the ability to capture CO2, and then study on the mechanism of its high CO2 capture and catalytic conversion, get recycled environmental protection material and clean renewable energy, and put forward new way of thinking for global climate change, greenhouse effect and atmospheric environmental management, etc.