

Facile Low-Temperature Synthesis of Novel Carbon Nitrides for efficient carbon Dioxide Conversion into Value- Added Chemicals

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ABSTRACT

A method (100) for cycloaddition of CO₂ to epoxides using carbon nitride (CN) (102) as catalysts may be provided. The method (100) may include mixing 110) 5-aminotetrazole (104) and triethylamine (106) to obtain a mixture (108). Further, cyanuric chloride (112) may be mixed with the mixture (108) to obtain 4NZ-CN (114). Further, the method (100) may include using (120) 4NZ-CN for the cycloaddition of CO₂ to epoxides (116) to produce cyclic carbonates (118). The 4NZ-CN (114) used for the cycloaddition of CO₂ to epoxides (116) for the production of cyclic carbonates (118), may eliminates the high emperature requirement for the preparation of catalyst, decreases the cost of the catalyst production and thereby decreases the overall cost of the cycloaddition of CO₂ to epoxides. Similarly, a method (200) may be provided where the catalyst is 3NZCN, obtain by similar method using different compounds.

KEY APPLICATION AREAS

1. Carbon dioxide (CO₂) utilization.
2. Carbon capture and utilization (CCU).
3. Green catalysis.
4. Sustainable chemical synthesis.
5. Cyclic carbonate production.
6. Chemical and petrochemical industries.

POTENTIAL USES

1. Conversion of CO₂ into value-added cyclic carbonates.
2. Metal-free catalytic CO₂ fixation.

3. Low-temperature, solvent-free chemical processes.
4. Production of battery electrolyte and polymer intermediates.
5. Environment-friendly fine chemical manufacturing.
6. Scalable, cost-effective CO₂ conversion for industrial applications.