Novel Biodegradeable and Eco-Friendly Porous Carbon Dioxide Adsorbent Porous Coordination Polymer

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Due to the use of fossil fuels and industrial activities ,carbon dioxide emissions are continuously increasing .The current carbon dioxide concentration exceeds 415 ppm, highlighting the pressing need to efficiently capture and utilize this gas. People and animals continue to suffer from the effects of global warming which include ocean acidification (which has risen by 25% from the preindustrial times), melting of polar caps, climate change which automatically accompanies poor air quality resulting in high rates of skin and lung cancer. Porous coordination polymers are one of the promising measures to adsorb carbon dioxide, however their current synthesis methods have a lot of drawbacks including the use of toxic chemicals(for example terephthalic acid and dimethyl sulphoxide).Their cost of production , complex regeneration processes and harsh functional conditions are some of their major disadvantages . Herein the present study proposes the advent of a biodegradable carbon dioxide adsorbent porous coordination polymer made from 2,5 furandicarboxylic acid(a biomass derivative made from the oxidation of dehydrated fructose) and zinc oxide, using water and ethanol as solvents in the process. The polymer exhibited a calculated adsorption capacity of 2,2cm3 ,a surface area of 564 m2 /g and an average calculated pore size of 2nm.The captured carbon dioxide can then be used for electricity generation without producing any harmful byproducts through spontaneous dissolution of carbon dioxide in distilled water, using magnesium and platinum iridium as electrodes.

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