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Carbon adsorption using environmentally sustainable carbon spheres

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Carbon dioxide emissions caused due to the combustion of fossil fuels is a major issue that requires attention. Therefore, methods to improve carbon adsorption technology using porous carbon spheres have been investigated. Carbon spheres refer to nano or microscale materials that have the ability to adsorb carbon as well as store and convert renewable energy. Carbon spheres also play a significant role in catalysis, gas adsorption, drug delivery and water treatment. Carbon adsorption technology allows capturing carbon with the help of carbon spheres instead of allowing it to be released into the atmosphere. Recently, scientists from Swansea University have discovered a new method to manufacture porous carbon spheres in a single step and in a more environmentally sustainable way. The researchers have employed a chemical vapour deposition (CVD) method for manufacturing the spheres. The CVD method was applied in a range of 600-900°C, using pyromellitic acid as a carbon and oxygen source, and the adsorption capacities of spheres were measured under different temperatures and pressures. As a result of the experiment, 800Ã‹Å¡C was found as the most suitable temperature for manufacturing carbon spheres. Specific surface area and total pore volume which is affected by deposition temperature had a positive effect on carbon adsorption. The highest carbon adsorption capacities were observed at 0Ã‹Å¡C with 4.0 millimole/gram and at 25Ã‹Å¡C with 2.9 millimole/gram of carbon. Thanks to this newly developed method, which does not require a solvent to purify the material or any hazardous gases; the production of carbon spheres can be made easily from accessible raw materials in a green and sustainable way.

Keywords: Carbon spheres, Carbon adsorption, Chemical vapour deposition, Sustainable technology

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