

Mineral carbonation to sequester carbon dioxide into a permanent, solid and stable form.

Carbon is emitted into the atmosphere (as carbon dioxide (CO₂)) whenever we burn any fossil fuel, anywhere. The largest sources are transport, and power stations that burn fossil fuels: coal, oil or gas. To prevent the carbon dioxide building up in the atmosphere, we can catch the CO₂, and permanently store it into a useable product.

Within the Midlands Energy Consortium we are investigating various CO₂ Capture and Storage related technologies. One of the technologies that are being investigated at the Centre for Innovation in Carbon Capture and Storage (CICCS) at the University of Nottingham uses a natural process in conjunction with silicate-based rocks such as serpentine. The mineral is found in large enough quantities, and in the right places, to store all the CO₂ produced by the combustion of the entire world's known fossil fuel reserves.

The CO₂ extracted from burning coal is put into a reactor with the rocks and through a chemical reaction. The serpentine binds the carbon dioxide to itself, 'locking it in' permanently. This reaction does occur in nature — only far more slowly, taking place over eons of time.

Once the process is fully developed, it is estimated that the locking of CO₂ will take place within minutes.

The end product is a mineral such as magnesite, which can be used as aggregates for road-building or shaped into bricks for construction. Carbon dioxide makes up 40 per cent of its weight and it would take 1,500 times more space to store the same amount in gas form.

Compared to other proposed processes for carbon storage, such as burying carbon under the sea, once the CO₂ is locked inside the rock, it is contained for good and cannot go back to its previous state. This is of paramount importance as ensuring the permanent storage of the CO₂ has been the most controversial issue in carbon storage.



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