Objective

With aid of cutting-edge nano-technology, this project aims to develop economically viable, carbon-negative construction materials with the potential to abate human CO₂ emissions.

Project Details

The cement industry is under scrutiny. To achieve the Paris Agreement’s targets and reach net-zero CO₂ emissions by 2050, it needs to cut its emissions from the current 2.2 gigatonnes of CO₂ per year to ~1.5 within the next years (Figure 1).

A promising approach to offset this carbon footprint is to develop cement-based materials that can be cured with CO₂ instead of water. But the challenge is finding economically viable cement combinations that can render CO₂-cured construction materials with high performance.

With aid of cutting-edge nano-characterization instruments and nanomaterials, this project will investigate the utilization of different Australian waste resources (e.g., brown coal fly ash from landfills) to create special cement-based construction materials that can effectively capture CO₂ from industrial polluters using CO₂ curing conditions.

Prerequisites - CIV2235 - Structural materials

Figure 1. CO₂ emissions of the cement industry and approach to capturing the CO₂ back.