ECRA ACADEMIC CHAIR “FROM CO₂ TO ENERGY” AT THE UNIVERSITY OF MONS: CO₂ CAPTURE & REUSE IN THE CEMENT INDUSTRY

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The reduction of the CO₂ emissions from different industries (power plants, cement plants, etc.) at world scale requires the implementation of Carbon Capture, Storage and Utilization (CCSU) processes. The application of CCSU to power plants flue gases (CO₂ contents from 5% to 15%) has already been considered in many studies but there is still a lack of data concerning its specific application to the cement industry (\(\gamma_{\text{CO}_2} > 15\%\)).

Regarding the capture phase, two technologies are adapted to the cement industry, namely:
- the post-combustion CO₂ capture (currently tested at pilot scale in the cement industry), where the CO₂ in the pretreated flue gas (containing from 20% to 40% CO₂) is conventionally captured thanks to an absorption-regeneration process where it is absorbed in a solvent (such as monoethanolamine 30 wt.%) which is then regenerated requiring energy;
- the oxy-fuel combustion CO₂ capture (the selection of a cement plant for pilot tests is ongoing), where the combustion is performed with pure oxygen leading to flue gases highly concentrated in CO₂ (>80%) which need to be purified (de-SO₂, de-NOₓ, etc.) prior to conversion into valuable products such as methanol.

Another option envisaged by the cement industry is the “partial oxy-fuel combustion CO₂ capture” which corresponds to an hybrid process which combines the combustion with O₂-enriched air (CO₂ contents in the flue gas between 45% and 60%) and post-combustion CO₂ capture by the absorption-regeneration process.

In this context, the ECRA (European Cement Research Academy) Academic Chair was established at UMONS in 2013, focusing on the CO₂ capture and reuse applied to the cement industry. Initially scheduled for a first period of 3 years, the ECRA Academic Chair has been recently prolonged until mid-2019!

**CO₂ CAPTURE**

**CO₂ PURIFICATION**

**CO₂ CONVERSION**