Contribution ID: **406** Type: **Oral**

Assesment of the natural absorption of CO2 performed by steelmaking slag

Tuesday 7 October 2025 11:50 (20 minutes)

Electric Arc Furnace (EAF) and Ladle Furnace (LF) slag, a byproduct of steelmaking, has emerged as a promising material for the natural capture of CO_2 through a process called mineral carbonation. Composed primarily of calcium and magnesium oxides, EAF slag reacts with atmospheric CO_2 to form stable carbonates, such as calcite and magnesite, under ambient conditions. This natural carbonation process not only sequesters CO_2 but also improves the slag's mechanical properties, making it suitable for use in construction materials like cement and aggregates. The carbonation of EAF slag offers a dual benefit: it reduces the carbon footprint of steel production by capturing CO_2 and transforms industrial waste into valuable resources. While the process occurs naturally, factors such as slag composition, particle size, and environmental conditions influence its efficiency. This study is ongoing to optimize carbonation rates and integrate this process into industrial practices, providing a sustainable pathway for mitigating greenhouse gas emissions and advancing circular economy principles in the steel industry.

Primary author: Prof. MAPELLI, Carlo (Dipartimento di Meccanica - Politecnico di Milano)

Co-authors: DA VAL, Elena (Fassa Bortolo); MORESCHI, Roberto (Fassa Bortolo); BALDO, Giovanni (Fassa Bortolo); MOMBELLI, Davide (Dipartimento di Meccanica - Politecnico di Milano); DALL'OSTO, Gianluca (Politecnico di Milano); BARELLA, Silvia (Politecnico di Milano)

Presenter: Prof. MAPELLI, Carlo (Dipartimento di Meccanica - Politecnico di Milano)

Session Classification: Circular Economy & Industrial Symbiosis

Track Classification: Environmental and energy aspects in iron and steelmaking