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Review

Deploying the carbon capture technologies for CO₂ emission mitigation in the industrial sectors



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ABSTRACT

Carbon capture technologies will play an essential role in reaching a zero-carbon economy by 2050, and the industrial sector is one of the main areas in which these technologies may be deployed. This work aims to identify and analyze the main industrial sectors that have the potential to deploy carbon capture globally. The initial methodology procedure of this paper is organized into three steps: (i) A systematic literature review is conducted using the Scopus database; (ii) followed by a bibliometric study and; (iii) quantification of the potential of carbon capture in all countries. The processed review data showed that iron and steel production is the industrial sector with the highest number of papers (13 papers), followed by cement manufacturing (8 papers). Besides that, the efficiency and type of carbon capture technology deployed were also evaluated. The data found varied by industry sector, with ethanolamine (MEA) or metil diethanolamine (MDEA) post-combustion and chemical looping technology being frequently cited. As the main results, the number of citations indicates that iron and steel production, followed by cement manufacturing, is the most advanced industrial sector in terms of scientific research on deploying carbon capture technologies. In addition, the countries that demonstrated the greatest potential for carbon capture are China (5,700 mtCO₂/y) and the United States (2,100 mtCO₂/y), followed by India (1,300 mtCO₂/y), Russia (807mtCO₂/y), Japan (564 mtCO₂/y), and South Korea (403 mtCO₂/y).