

## METAL OXIDES IN FLUIDIZED BED CONVERSION SYSTEMS

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Several fluidized bed conversion concepts utilizing metal oxide particles have been proposed in the last decade. The use of metal oxide particles in fluidized bed conversion systems stems largely from the research around chemical-looping combustion (CLC). Here, a metal oxide is used as an oxygen carrier for transport of oxygen from combustion air to the fuel. Although the concept was proposed already in the 1950's, most of the research has been carried out after the turn of the century. The research was sparked by the need for viable technologies for carbon capture, and CLC is here a breakthrough technology with low costs for capture and a high carbon capture efficiency. Today a large number of oxygen carrier particles have been developed and tested and around 30 continuous units up to 3 MW have been operated around the world. The research around CLC and oxygen carriers has sparked the development of several other fluidized bed processes where oxygen carriers or metal oxide particles can be used to enhance performance. These include fluidized bed processes for gas, solid and liquid fuels for heat, power and syngas production. Chalmers has been active within CLC research for over 15 years and also has activities within these related processes. In addition to CLC, this paper will provide an overview of these technologies: i) Oxygen carrier aided combustion, ii) Dual-bed fluidized bed gasification (DFBG), iii) Chemical-looping reforming (CLR) and iv) gasification gas conditioning (CLTR). Some important criteria for metal oxides will be discussed in relation to the application.