



## Numerical Simulation of Oxy-fuel Combustion

By Simon Leiser

Shaker Verlag Jan 2011, 2011. Taschenbuch. Book Condition: Neu. 212x145x8 mm. Neuware - A modelling framework for the numerical simulation of oxy-fuel combustion with flue gas recycle to be applied in computational fluid dynamics was developed and validated against experimental data. Special attention was drawn on accuracy, generality, robustness and computational efficiency of the developed models. The models are tailored for the numerical simulation of future full-scale oxy-fuel boilers and are capable of exploiting computational resources of modern supercomputers. Basis of the models are the general conservation equations for mass, momentum, energy and species. A global homogeneous combustion model that accounts for the chemical effects of a high CO<sub>2</sub> concentration under oxy-fuel conditions by means of reversible reaction pathways was developed. The EDC turbulence-chemistry interaction models was generalised and extended to account for reactions in the surrounding fluid. The char conversion model was derived on a general physical basis to account for boundary layer diffusion and pore diffusion with chemical reaction. Kinetic constants for char gasification reactions with oxygen, carbon dioxide and water vapour have been determined. A global NO<sub>x</sub> model for coal combustion based on literature data is proposed. Two different modelling approaches for radiative heat transfer, a spectral...



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