1. Record Nr. UNINA9910337588503321

Autore	Yuan Ye
Titolo	Optic Diagnostics on Pulverized Coal Particles Combustion Dynamics and Alkali Metal Release Behavior / / by Ye Yuan
Pubbl/distr/stampa	Singapore : , : Springer Singapore : , : Imprint : Springer, , 2019
ISBN	981-10-4813-4
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (XXI, 151 p. 98 illus., 87 illus. in color.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	621.042
Soggetti	Energy systems Chemical engineering Lasers Photonics Fossil fuels Materials science Energy Systems Industrial Chemistry/Chemical Engineering Optics, Lasers, Photonics, Optical Devices Fossil Fuels (incl. Carbon Capture) Characterization and Evaluation of Materials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Theoretical and experimental research on coal particle devolatilization -- Theoretical and experimental research on coal particle ignition mechanism -- Dynamic behavior of sodium release during coal combustion -- Theoretical and experimental research on surface temperature during char combustion -- Conclusion.
Sommario/riassunto	This book focuses on pulverized coal particle devolatilization, ignition, alkali metal release behavior, and burnout temperature using several novel optic diagnostic methods on a Hencken multi-flat flame burner. Firstly, it presents a novel multi-filter technique to detect the CH* signal during coal ignition, which can be used to characterize the volatile release and reaction process. It then offers observations on the

prevalent transition from heterogeneous ignition to hetero-homogeneous ignition due to ambient temperature based on visible light signal diagnostics. By utilizing the gap between the excitation energies of the gas and particle phases, a new low-intensity laser-induced breakdown spectroscopy (PS-LIBS) is developed to identify the presence of sodium in the particle or gas phase along the combustion process. For the first time, the in-situ verification of the gas phase Na release accompanying coal devolatilization is fulfilled when the ambient temperature is high enough. In fact, particle temperature plays a vital role in the coal burnout process and ash particle formation. The last part of the book uses RGB color pyrometry and the CBK model to study the char particle temperature on a Hencken burner. It offers readers valuable information on the technique of coal ignition and combustion diagnostics as well as coal combustion characteristics.