Preface

Due to its environmental friendliness, economic efficiency, and thermal efficiency, integrated gasification combined cycle (IGCC) power technology has been regarded as one of the most promising clean coal technologies. In IGCC system, the gas produced from coal gasification process usually contains large amounts of H_2S which can cause severe corrosion of gas turbine leaves and reduce its serving lifetime. The conventional wet absorption technique using amine solution can only occur at a much lower temperature than gasification temperature resulting in substantial loss of the thermal efficiency due to the hot syngas cooling down and the subsequent reheating up process. H_2S removal using regenerable solid sorbents at high temperature can not only improve the system thermal efficiency but also simplify the purification equipment. Therefore, hot coal gas desulfurization plays a crucial role in clean coal technology.

This book presents the research achievements on IGCC coarse gas desulfurization. The authors mainly developed two kinds of high-temperature desulfurizers (ZSM-5-supported rare-earth oxides and carbon aerogel-supported nano elemental metals), and they both exhibit good desulfurization performances at high temperatures. The impacts of reaction temperature, textural property (surface area and pore structure), and feed gas content (CO and H_2) on the desulfurization performance has been investigated as well. The studies of suffixation kinetics and thermodynamics are also conducted to obtain a better understanding of the desulfurization mechanism. The authors sincerely hope that this book can contribute to the development of high-performance desulfurizers, the industrial application of the IGCC power technology, and the enrichment of the clean coal technology. The presented work of

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