PREFACE

A binary fluid system has an efficient heat recovery compared to a single-fluid system due to a better temperature match between hot and cold fluids. This book provides a good understanding of binary fluid systems, highlighting new dimensions to the existing Kalina cycle system (KCS), a thermodynamic process for converting thermal energy into usable mechanical power. The volume illustrates that providing new flexibility leads to new research outcomes and possible new projects in this field. The information provided in the book simplifies the application of KCS with an easy-to-understand and thorough explanation of properties development, processes solution, subsystem work, and total system work. There are currently no other books available in the area of binary fluid system in the field of KCS with added flexibility in the operation and process design. Currently, decentralized power systems are gaining more attention due to shortages in power. Also, the cooling demands are crossing other electrical loads. This book fills this information gap, providing insight into a new dimension for designers, practicing engineers, and academicians in this field.

KCS is a vapor absorption power cycle developed from the improvement of the Rankine cycle. In this book, KCS configurations are studied to suit low-temperature (LT), intermediate-temperature (IT), and high-temperature (HT) heat recoveries. The LT heat source is restricted from 100°C to 200°C to suit the KCS process conditions. The IT heat recovery is limited up to 300°C. Above this temperature, the heat recovery is termed as HT level. Thermodynamic processes in binary mixture plants are formulated and evaluated for thermodynamic model after properties generation. A detailed methodology is presented to solve binary vapor processes and its vapor cycles. The key operational parameters have been identified, and its influence has been analyzed on energy performance to recommend the efficient running conditions for the configurations considered. The results are used to select the operation conditions in boiler, separator, and turbine to maximize the power output and efficiency of the plant.

KCS at low-temperature heat recovery (LTHR) is exhaustively investigated by identifying the individual component's role, namely, superheater, LT regenerator, high-temperature regenerator (HTR), and dephlegmator. Two possible boiler connections are studied to relax the boiler load. The

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—Dr. Tangellapalli Srinivas