Preface

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Materials selection as an integral part of design process is a challenging task in today's competitive manufacturing environment. The success of a product in the market can depend on the decisions made by designers at the stage of material selection as it has an interdependency relationship with the selection of manufacturing process, the product's functional requirements, shape, and cost. The presence of multiple conflicting criteria in most engineering design cases, as well as the large number of accessible materials for a given application, are among factors that have recently raised interest of decision makers even in small scale industries to use available computational tools such as the computer aided design (CAD) and finite element analysis (FEA) codes along with the multiple criteria decision making (MCDM) techniques. In addition, in complex design cases, the selection process has been closely tied to the expert knowledge for prioritising design goals and objectives under which materials' mechanical, physical, electrical, and manufacturing properties should be compared.

This special issue primarily presents a collection of recent research reports covering both methodological and application aspects of available engineering decision-making tools for materials selection of real-world design cases such as light-weight naval crafts, turbine blades, gears, hip prosthesis, automotive piston, and light-weight material options for vehicular panels. In particular, capabilities and applicability of different MCDM methods in a diverse set of engineering decision situations are examined and in some cases new recommendations are made. A few sample articles on design and testing of advanced materials have also been included.

The quality of published articles owes to the authors' excellence in research as well as the constructive feedbacks and comments received from the anonymous reviewers. The guest editors would like to thank all the authors as well as the reviewers who enabled us to complete this project. The guest editors would also like to gratefully acknowledge the distinguished pioneers of the material selection field, including Professors Michael F. Ashby, Kevin Edwards, and Mahmoud M. Farag. Without their ideas, books and manuscripts, this field would have not succeeded.