

### Guest Editors' Preface

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This special collection of papers on eutectics in the *Journal of Materials Science* is based upon research presented at the Fifth International Workshop on Directionally Solidified Eutectic Ceramics (DSEC V) held in Warsaw, Poland, April 3–7, 2016. Since the first DSEC workshop in Paris in 2003, every three years this workshop has brought together the international community of thermodynamicists, chemical physicists and materials scientists studying directionally solidified eutectics to exchange knowledge and share ideas. Over the past 10 years, the eutectics research field has produced in over 16,000 scientific publications. The objective of the DSEC workshops is to initiate and expand cooperation among leading scientists working in the theory, processing and application of directionally solidified eutectic ceramics. While ceramic eutectics were originally studied for their high-temperature thermo-mechanical properties, current and emerging research is pushing into new functional applications such as photovoltaics, photoelectrochemistry, photonics, plasmonics and metamaterials. DSEC V brought together 68 scientists from 13 different countries to discuss recent progress and future prospects for eutectics research and development. The five Guest Editors worked together to ensure that the papers met the standards required by the journal. We hope to see our readers at DSEC VI in Italy in 2019.