

Preface

The field of friction stir welding is approaching 20 years and the idea of a book that could serve as textbook has been around for many years now. The authors have been involved with many previous reviews and edited volumes that have served the friction stir welding and processing community well. The first comprehensive book in the form of an edited volume was published by ASM International in 2007. From 2001, there are also edited proceedings of friction stir welding and processing symposium. Of course, TWI technical meeting and symposium CDs have been a great source of information for this community. As the field grows and number of engineers, students and researchers involved increase, a need has been felt for a book that could serve as a textbook. That was our motivation for putting this book together, which is written to serve as an initial book for students at senior undergraduate level or graduate level. Engineers and researchers getting into the field of friction stir welding may find the book useful as a resource for continuing education. We have purposely kept the book short and avoided the urge to make it a comprehensive review. This book is certainly not aimed at involved researchers in this field or experts in this area, although they may find it helpful as they teach the subject to others. We do hope that such experts will find the book worthy of recommendation. In our desire to finish the book in a timely manner, we have not been able to finish all chapters to the level we had initially wished. We hope and request readers to provide their comments and feedback for future editions.

At the time of completion of this book (April 2014), one of the authors (RSM) has spent exactly 15 years in the field of friction stir welding and processing. He would like to acknowledge the start he got because of encouragement and mentorship from Murray Mahoney and Cliff Bampton. RSM was still a postdoctoral researcher at that time with Amiya Mukherjee at UC-Davis and in the transition phase to a faculty position at the University of Missouri–Rolla (UMR). Amiya's mentorship had helped in starting a small involvement and then transition to UMR. RSM's involvement in the area of friction stir welding and processing really got going when he established his Friction Stir Processing laboratory at UMR. The support from National Science Foundation and DARPA during the early days was very critical. Over the years, many students and postdoctoral researchers

contributed to my understanding of the friction stir process. The authors have learned much of what they know from these interactions in the research group, where Partha and Nilesh at one point were students.

The formation of National Science Foundation's Industry/University Cooperative Research Center was a key development for RSM's group at Rolla. This IUCRC also led to many collaborations and friendships. Bill Arbegast was not only a champion of the technology, he had the vision to bring a large group of researchers together under this umbrella. Over the years, it has been a pleasure to work with and learn from John Baumann, Glenn Grant, Blair Carlson, Chris Smith, Tony Reynolds, Tracy Nelson, Carl Sorensen, Dwight Burford, Yuri Hovanski, Kyu Cho, Kevin Doherty, K. K. Sankaran and many other colleagues under this IUCRC. The support from NSF, DARPA, ARL, ONR, Boeing, General Motors, Pacific Northwest National Laboratory, Pratt & Whitney, Friction Stir Link, Air Force Research Laboratory, Magnesium Elektron North America, NASA-JSC, Naval Surface Warfare Center, inside and outside this center has allowed continuous growth of our work and understanding. Without a sustained support, it would not have been possible to reach this stage where we put together this book!

One of the authors (PSD) also expresses his gratitude to IIT Bhubaneswar for granting him leave to work at the University of North Texas (UNT) for a month in 2013 at the initial stages of the preparation of this book. This stay was made all the more memorable by the complete support and hospitality extended by RSM, NK and their cheerful colleagues at UNT. RSM and NK are very thankful to the University of North Texas for all the support from the time they joined UNT in 2011.

Although we have not listed students and postdoctoral researchers by name, their tireless efforts are very much behind the body of this work. Many of their figures have been cited and sometimes without full acknowledgement. Apologies to all those whose work we could not properly cite.

We are very thankful to Springer, in particular Ania Levinson, for providing opportunity to put this textbook together and pushing us to the finish line. We are sure we tested their patience by missing numerous deadlines!

Finally, none of this would be possible without the support of our families and their sacrifices. So, we close with a big thank you to family members and friends.

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