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# Preface

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This issue contains 27 papers from *The International Symposium on Characterization of Real Materials and Real Processing by Transmission Electron Microscopy* that was held at Noyori Conference Hall, Nagoya University, Nagoya, Japan, 26–27 January, 2005.

Transmission electron microscopy (TEM) is now well established as a key enabling technology in materials science and engineering (MS&E). It is indispensable for our understanding of the structure-properties-processing link for real materials. Thanks to recent developments in instrumentation and relevant techniques in TEM, the frontiers of MS&E that can be successfully explored by TEM have advanced significantly. It is now possible to make observations on features that we previously thought would never be observed. For example, solid-liquid reactions, which certainly play a crucial role in materials processing, can now be observed even at near atomic resolution under some circumstances. However, there are still many fields of MS&E where TEM has not yet been applied successfully, although we have strong hopes for the future. It is felt to be quite timely to review what has been done so far, what can be done now, and what must be done in the near future in characterizing real materials and real processing using state-of-the-art TEM techniques. The organizer has dedicated his academic career to the characterization of real materials and real processing by TEM over the past four decades. On the occasion of his retirement from Nagoya University, therefore, it was decided to organize an international symposium on this very important and exciting topic of MS&E.

Nagoya University January 26 & 27, 2005

*Front row (from left to right):* J. Buban, F.M. Ross (& Kathryn Ross), R. Sinclair, E. Johnson, P. Veyssiere, C.B. Carter, H. Saka, C.J. Humphrreys, M.L. Jenkins, D. Cherns, Y. Zhu, B.Y Choi,
*Middle Row (from left to right):* T.J. Konno, B. Battuello, K. Kuroda, I. Yonenaga, T. Morikawa, S. Tanaka, J.L. Hutchison, A. Sakai, G. Taylor, F. Louchet, D. Caillard, F. Phillipp, R. Hull, U. Dahmen,
*Back Row (from left to right):* R. Che, UnKnown, S. Tsukimoto, W.-J. Moon, S. Yamazaki, S. Ichikawa, T. Kato, K. Higashida, Y. Nishino, E. Sukedai, T. Oikawa, S. Watanabe, T. Yamamoto, Y. Tokumoto

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The organizer then consulted the Editor of *Journal of Materials Science*, C.B. Carter, who kindly agreed to publish the articles presented at this symposium after they had gone through the usual refereeing process. The organizer thanks the publishers for agreeing to publish the papers in this special issue.

The symposium was attended by approximately 90 participants from 8 countries (Japan, USA, UK, France, Germany, Denmark, China, Korea). 17 papers were invited for oral presentation. The invited speakers were C.J. Humphreys (Cambridge, UK), D. Cherns (Bristol, UK), R. Hull (Virginia, USA), M.L. Jenkins (Oxford, UK), C.B. Carter (Minnesota, USA), R. Sinclair (Stanford, USA), F.M. Ross (Yorktown, USA), J.L. Hutchison (Oxford, UK), G. Taylor (Oxford, UK), P. Veyssier (Chatillon, France), D. Caillard (Toulouse, France), F. Louchet (St Martin d'Heres, France), E. Johnson (Copenhagen, Denmark), U. Dahmen (Berkley, USA), F. Phillipp (Stuttgart, Germany), Y. Zhu (Brookhaven, USA) and H. Saka (Nagoya, Japan). In addition to these invited presentations, 45 articles were contributed for the poster presentation. The invited and contributed articles covered a tremendous variety of subjects, showing the manifest benefits of TEM when applied to solving problems encountered in handling real materials and real processing.

Not all the presentations made were submitted for publication. However, all the papers included in this special issue have gone through the usual JMSc refereeing process. The Editor thanks all the authors for submitting their papers to this special issue and all the referees for their help.

Finally, it is hoped that the readers will find the papers in this special issue stimulating and useful in inspiring their future work.

*Guest Editor*
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