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# Small. Specimen

## Test Techniques:

5th Volume

Mikhail A. Sokolov  
**Guest Editor**

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**Small Specimen Test Techniques:**  
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## Foreword

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THIS SPECIAL ISSUE OF *JAI*, Special Technical Publication STP 1502, *Small Specimen Test Techniques: 5th Volume*, contains papers presented at the symposium with the same name held January 31–February 1, 2007 in Anaheim, California. The symposium was sponsored by ASTM International Committee E10 on Nuclear Technology and Applications. The symposium chairman and editor was Mikhail A. Sokolov, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.

# Contents

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Overview .....	vii
<b>Specimen Size Limitations in <i>J-R</i> Curve Testing—Standards Versus Reality</b> K. Wallin .....	1
<b>Miniature Compact Tension Specimens for Upper Shelf Fracture Toughness Measurements on RPV Steels</b> E. Lucon and M. Scibetta .....	18
<b>Using Subsize Impact Bend Specimens for Estimation of Irradiation and Re-Irradiation Embrittlement of VVER RPV Steels</b> Y. A. Nikolaev and A. V. Nikolaeva .....	32
<b>Towards Crack Arrest Testing Using Miniature Specimens</b> M. Scibetta, R. Link, J. Schuurmans, and E. Lucon .....	49
<b>Application of Subsize Specimens for Re-Irradiation Embrittlement Monitoring of the First Generation of VVER-440 RPV Steels</b> Y. I. Shtrombakh, Y. A. Nikolaev, and A. V. Nikolaeva .....	70
<b>Application of Digital Marker Extensometry to Determine the True Stress-Strain Behavior of Irradiated Metals and Alloys</b> M. N. Gusev, O. P. Maksimkin, I. S. Osipov, and F. A. Garner .....	79
<b>Crack Arrest Testing Using Small Wide Plate SE(T) Specimens</b> R. E. Link and C. Roe .....	93
<b>Fracture Toughness Evaluation of Eurofer97 by Testing Small Specimens</b> M. Serrano, P. Fernández, and J. Lapeña .....	114
<b>Effect of Ta Rich Inclusions and Microstructure Change During Precracking on Bimodal Fracture of Reduced-Activation Ferritic/Martensitic Steels Observed in Transition Range</b> H. Tanigawa, M. A. Sokolov, A. Sawahata, N. Hashimoto, M. Ando, K. Shiba, M. Enomoto, and R. L. Klueh .....	122
<b>Application of Subsize Specimens for Irradiation Embrittlement Monitoring of VVER-440/213 RPV Steels</b> Y. A. Nikolaev and A. V. Nikolaeva .....	136
<b>Effects of Surface Morphology and Distributed Inclusions on the Low Cycle Fatigue Behavior of Miniaturized Specimens of F82H steel</b> S. W. Kim, H. Tanigawa, T. Hirose, and A. Kohyama .....	159
<b>Use of KLST-Type Miniature Charpy Specimens for Measuring Dynamic Fracture Toughness under Impact Loading Rates</b> E. Lucon and M. Scibetta .....	170
<b>Determination of Transferable Lower-Bound Fracture Toughness from Small Specimens</b> H.-J. Schindler, D. Kalkhof, and P. Tipping .....	180
<b>Surveillance of the Fracture Behavior of Zircaloy-4 Welds Using the Small Punch Test</b> T. Wei, D. G. Carr, H. Li, K. Smith, and R. P. Harrison .....	196
<b>Application of the Small-Punch Test to Irradiated Reactor Vessel Steels in the Brittle-Ductile Transition Region</b> T. Linse, M. Kuna, J. Schuhknecht, and H.-W. Viehrig .....	218

<b>Investigation of Material Fatigue Behavior Through Cyclic Ball Indentation Testing</b> R. V. Prakash, P. Bhokardole, and C. S. Shin . . . . .	<b>236</b>
<b>Author Index . . . . .</b>	<b>257</b>
<b>Subject Index . . . . .</b>	<b>259</b>

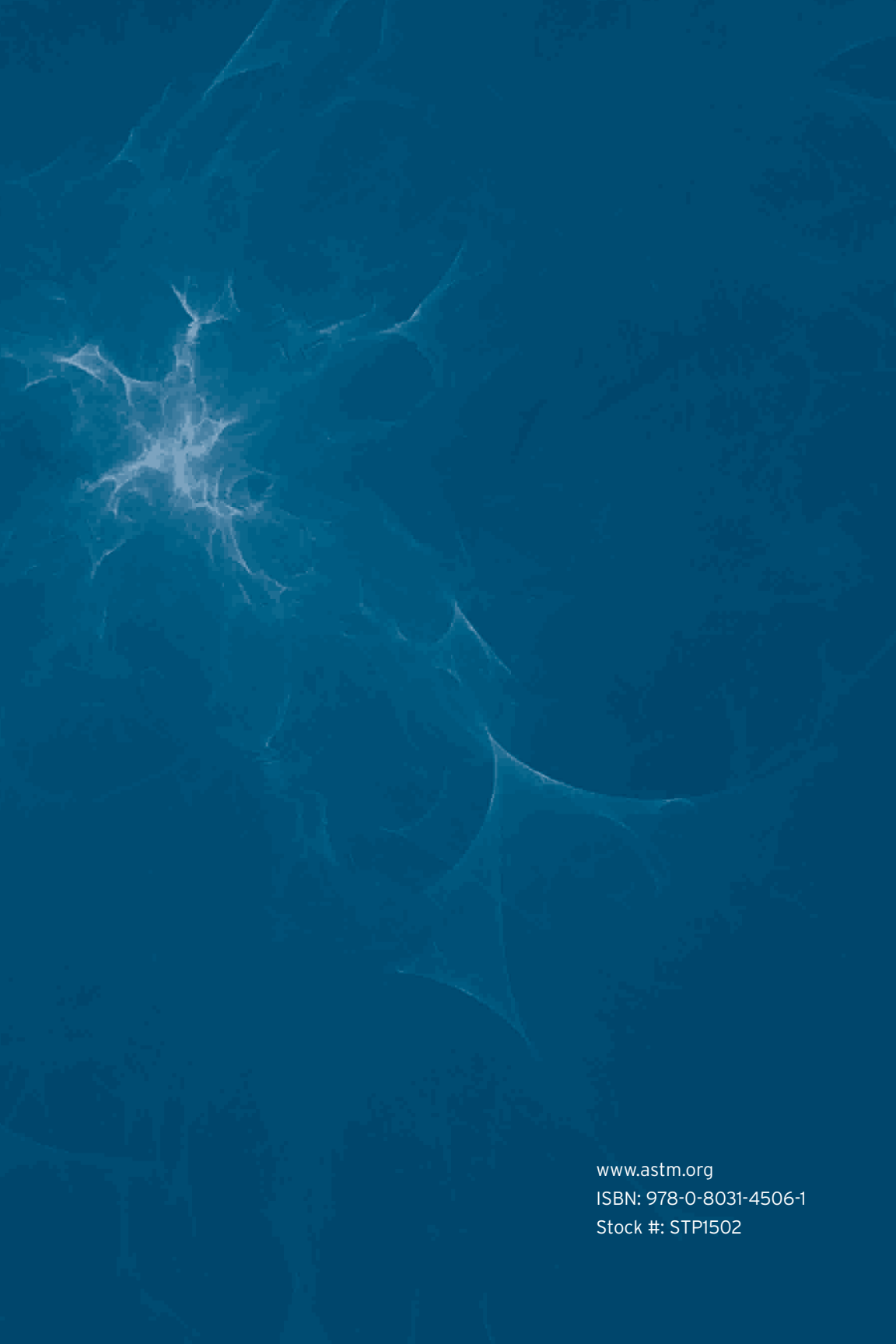
## Overview

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The 5th Symposium on Small Specimen Test Techniques was held January 31–February 1, 2007 in Anaheim, California. This is the fifth in a series that commenced in 1983 in Albuquerque, New Mexico, and focused on test techniques for fusion reactors. The second was held in New Orleans, Louisiana, in 1992 and focused on test techniques and their applications to reactor pressure vessel annealing and life extension. The third was held in New Orleans, Louisiana, in 1997 and focused on the use of reconstituted specimens. The fourth was held in Reno, Nevada, in 2001 and focused on fracture toughness measurements using subsize specimens as well as correlations between subsize specimens results and those from standard test techniques. It has served as an important international forum for the exchange of ideas and techniques for extracting mechanical property information from relatively small volume specimens. This effort has largely been driven by the limited volumes of material afforded in irradiation experiments for the developments of fusion reactor materials, as well as the need to improve the information obtainable from specimens in existing light water power reactor surveillance programs. Hence, there has been a cross-fertilization of ideas from the fission and fusion communities, and techniques thus obtained have spawned interest in non-nuclear applications.

The papers presented in this 2-day symposium have been collected in a single volume of this Special Technical Publication. Most of the papers deal with use of small size specimens for fracture toughness characterization of irradiated materials. This has been the area of major increase in small specimen applications because of advances in the Master Curve methodology. However, it is gratifying to see successful attempts to apply small size specimens for ductile fracture processes, dynamic fracture toughness, and even crack arrest toughness characterizations. One of these papers deals with microstructural features that might be related to scatter of fracture toughness in the transition region. Three papers provide a very broad description of current use of small specimens for assessment of the first as well as the newest generations of VVER-type reactors. Two papers are dedicated to expand applicability of small punch testing for fracture toughness evaluation of irradiated materials. One paper looks at application of digital marker extensometry to determine the true stress-strain behavior of irradiated materials. Miniaturized hourglass-type fatigue specimens are used for creep-fatigue characterization of F82H-IEA heat in combination with microstructural observations of fractured surfaces. Finally, one paper looks at application of ball indentation testing for evaluation of fatigue properties of irradiated materials.

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