

EXPANDED ISSUE

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# MRS Bulletin



**MATERIALS RESEARCH SOCIETY**  
*Advancing materials. Improving the quality of life.*

## Graphene Fundamentals and Functionalities

Vol. 37, No. 12, 1113-1328

MRS BULLETIN

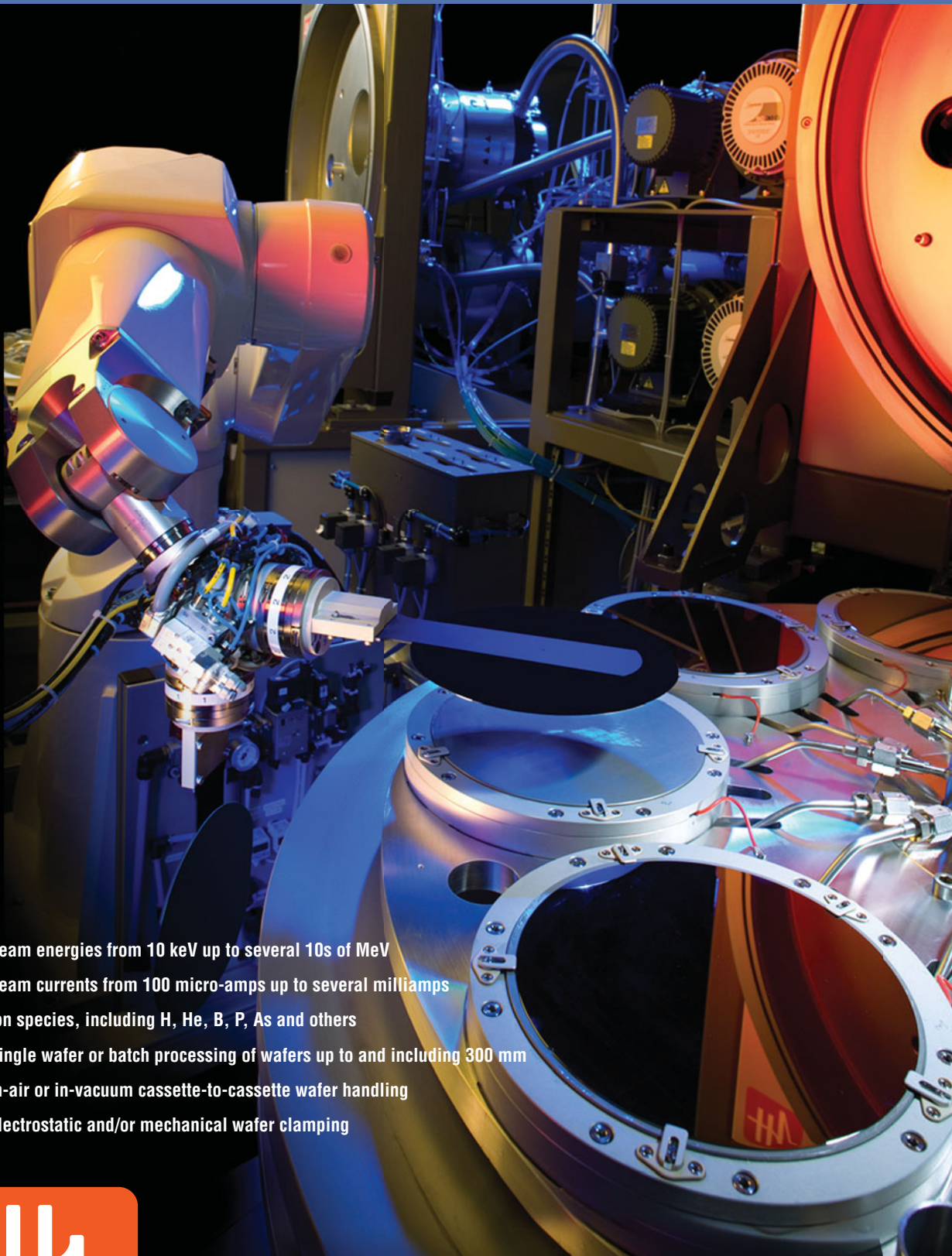
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December 2012

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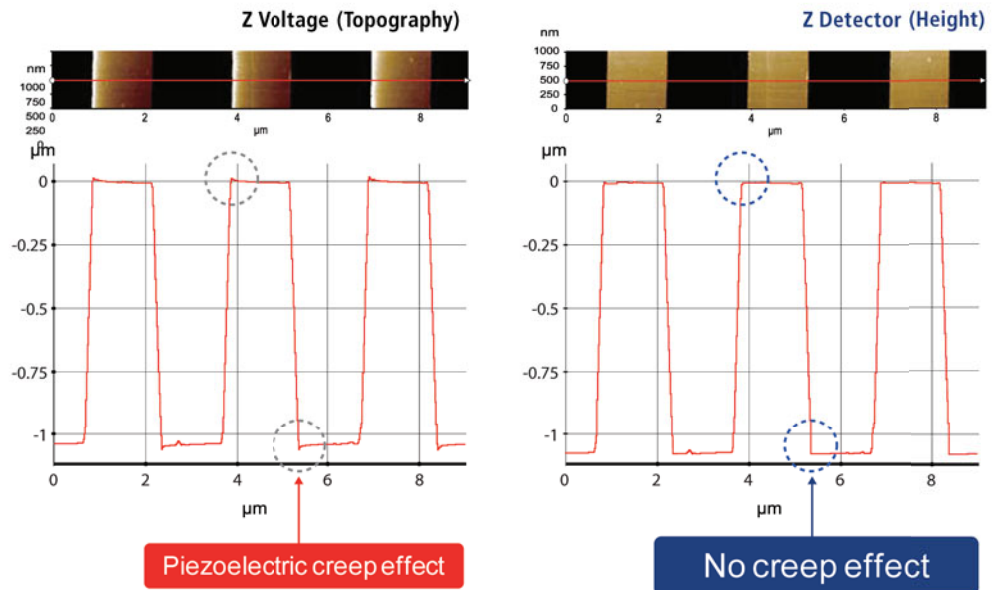
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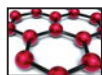


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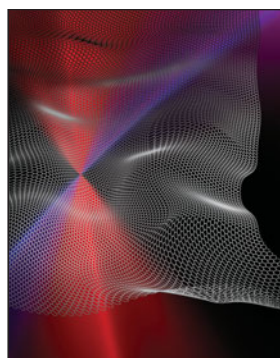
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### ON THE COVER

**Graphene: Fundamentals and functionalities.** With its two-dimensional single-atomic monolayer honeycomb lattice of carbon atoms in an  $sp^2$  hexagonal bonding configuration, graphene offers unique properties. Research on graphene has exploded over the past decade due to its ease of availability through exfoliation and epitaxial growth, as well as extensive experience with carbon nanostructures from the previous two decades. The

articles in this expanded issue of *MRS Bulletin* demonstrate the large impact of graphene on materials science, highlighting the newest advances, challenges, applications, and future directions. The cover shows an artist's rendition of the graphene monolayer structure, with its unique electronic band-structure in the background showing zero energy gap at the Dirac point between the vacant conduction band and the electron-filled valence band, indicated by the Dirac cones. See the technical theme that begins on page 1119.

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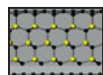
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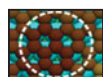
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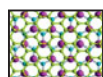
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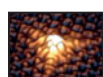
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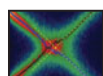
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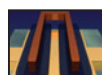


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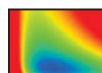




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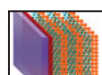
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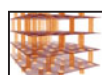
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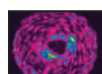
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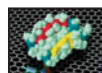
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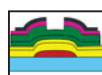
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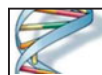
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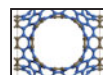


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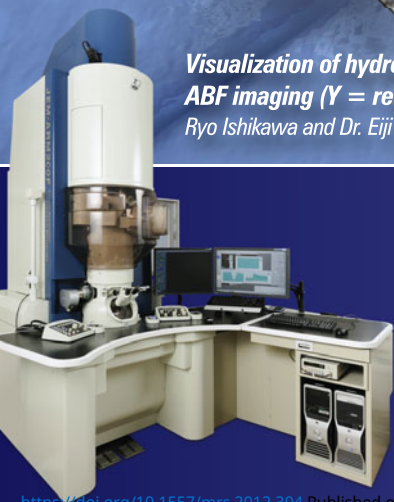
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