A short course on

**Mechanical Behavior and Fracture of Refractories**

to be given on the occasion of UNITECR 2011 in Kyoto

Title: Mechanical behavior and fracture of refractories

This course will be given by:

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Date: Sunday, October 30th, 2011

Time schedule:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8:00-8:30</td>
<td>Registration of participants</td>
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<tr>
<td>8:30-10:00</td>
<td>1. Fundamentals of linear elastic material behaviour and fracture mechanics</td>
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<td>Elastic properties of refractories, Youngs’ elastic modulus of refractories and influences of microstructure, strength of refractories, stress intensity factor</td>
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<td>10:00-10:30</td>
<td>Coffee break</td>
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<td>10:30-12:00</td>
<td>2. Fracture energies and fracture energy determination</td>
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<td>Fracture energies of single crystals, crack initiation and total work of fracture of refractoriès, fracture energy determination and R-curve measurement, energy dissipation mechanisms in refractory microstructures.</td>
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<td>12:00-13:30</td>
<td>Break</td>
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13:30-15:00

3. Application of wedge splitting tests according to Tschegg for refractory characterisation

Testing procedure and specimen design, stability of crack propagation, evaluation of results, figures-of-merit, typical examples, fractographic investigation of crack paths, structure/property relationships.

Harmuth

15:00-15:30

Coffee break

15:30-17:00

4. Fundamentals of material models for thermomechanical refractory behaviour and its simulation

Mode I fracture behaviour and the fictitious crack model according to Hillerborg, material laws for multiaxial stress state, theoretical considerations regarding thermal shock, industrial examples of thermomechanical behaviour

Harmuth

Courseware: Attendees will receive written handouts.

Target group:

Engineers and scientists including master and doctorate students who can benefit from a deeper understanding of fundamentals of refractory behaviour; technicians from the fields of quality management, research, production of refractories and refractory application.

Registration fees:

JPY 70,000 per person
JPY 63,000 per person, if three or more individuals from the same facility will attend