Welcome to 3.091

Lecture 20
October 26, 2009
Line, Interface, & Bulk Defects
"Burgers Vector," \( \mathbf{b} \)

The 'carpet-ruck' analogy of an edge dislocation.
polycrystalline Cu  W bicrystal

optical microscope  polarized light  field ion microscope
<table>
<thead>
<tr>
<th>Crystal Structure</th>
<th>CN</th>
<th>Close Packed Direction</th>
<th>Highest Density Plane</th>
<th>Close Packed Plane</th>
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</thead>
<tbody>
<tr>
<td>FCC</td>
<td>12</td>
<td>\langle 011 \rangle</td>
<td>{111}</td>
<td>yes</td>
</tr>
<tr>
<td>BCC</td>
<td>8</td>
<td>\langle 111 \rangle</td>
<td>{011}</td>
<td>no</td>
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<tr>
<td>SC</td>
<td>6</td>
<td>\langle 001 \rangle</td>
<td>{001}</td>
<td>no</td>
</tr>
</tbody>
</table>
Rivet from HMS Titanic

Tim Foecke, NIST
Microstructure of Rivet from HMS Titanic
Open Hearth Steelmaking (Siemens)

- Slag (SiO$_2$ - CaO - Al$_2$O$_3$)
- Metal (Fe - Si - C)
life out of balance

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musical score by Philip Glass