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Infrared studies of materials using synchrotron radiation

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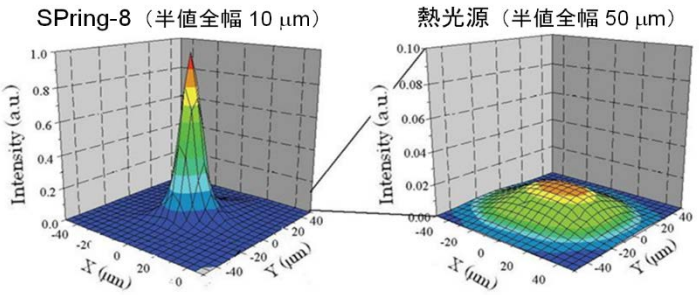
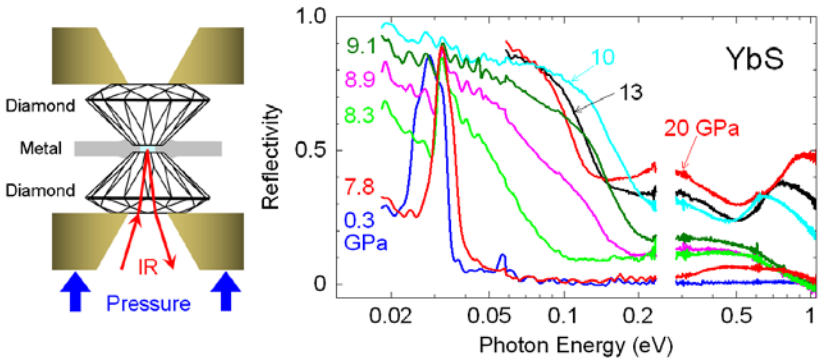
Infrared Synchrotron Radiation

- ✓ 10^2~10^3 times brighter than conventional IR source.
- ✓ Can be focused to a 10 μm diameter spot without an aperture (in the molecular vibration range).

→IR microscopy can be easily performed with a very high spatial resolution.



Comparison between SPring-8 and conventional IR source.



A high pressure IR study of YbS using SPring-8.

<Background>

- ✓ Infrared synchrotron radiation is much brighter than the conventional, black body radiation-based infrared sources. This brightness is utilized to perform infrared studies with high spatial resolution, such as micro-spectroscopy, high pressure studies using a diamond anvil cell (DAC), etc.

<Present research activities>

- ✓ Infrared studies of various materials under high pressure, using DAC and the infrared synchrotron radiation at SPring-8.
- ✓ Materials of main interest are the so-called ‘strongly correlated electron systems’, where strong electron-electron interaction results in interesting phenomena such as metal-insulator transition, heavy quasiparticle formation, superconductivity, etc.
- ✓ Development of super-spatial resolution IR microscopy using SPring-8 and near-field optics.

Keywords: Infrared spectroscopy, synchrotron radiation, high pressure, diamond anvil cell.

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