Realization of Absolute Optical-Frequency Measurement

Measurements of absolute optical-frequencies of various stabilized-lasers have been realized by using a femtosecond mode-locked laser and a phonic-crystal optical fiber (produced at the University of Bath, U.K.). The uncertainty of the measurements is 10^{-11} at present, and can be potentially improved to be better than 10^{-13}. In future, this technology will be applied to the optical frequency syntheses in various fields.

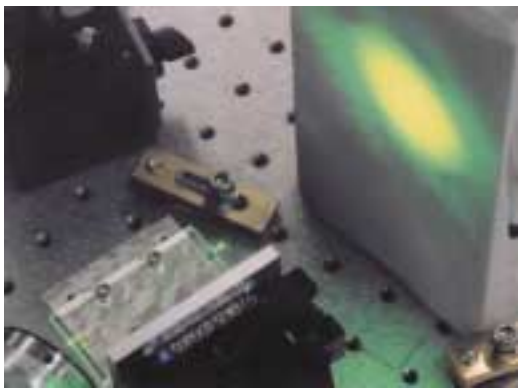

Figure shows the broad spectrum generated in a photonic crystal optical fibers using a mode-locked femtosecond pulse laser

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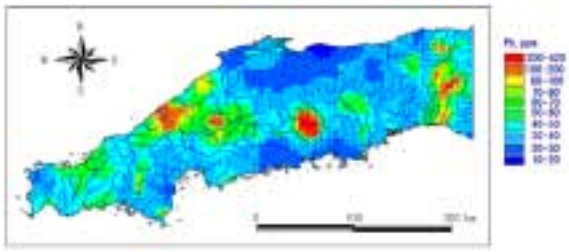
Geological Survey and Geoscience

Geochemical Map for Evaluating the Environmental Pollution

Geochemical map shows an elemental distribution in the surface of earth's crust, which gives us, for example, the concentration of toxic chemicals such as arsenic, mercury and cadmium around us and enables to evaluate what kind of influence affects our life from them.



Distribution map of Pb in Chugoku District

In 1988, a global geochemical map project covering entire world was planed by International Union of Geological Science (IUGS) and call for more than the world 70 countries to join the project. In European countries, the maps covering whole country have already been completed in England, West Germany, Finland and Poland.

The geochemical map of 53 elements in Japan covering whole country including toxic elements such as As, Be, Cd, Hg, Mo and Sb is now progressing in the National Institute of Advanced Industrial Science and Technology (AIST), and the compilation is scheduled to complete in 2003.

The geochemical map of Pb in Chugoku district is shown in Figure. The concentration of Pb is high in the several places where mineral deposits are located. The concentration of K_2O is high in east and middle of Chugoku District, where acidic rocks (granite and rhyolite) are distributed. And the elements of MgO, P_2O_5, and V are high in concentration in the west of Chugoku District, where basic rocks (andesite and basalt) are distributed. The relations between the elemental distributions, the background geology, the mineral deposits and human activities are now investigated.

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