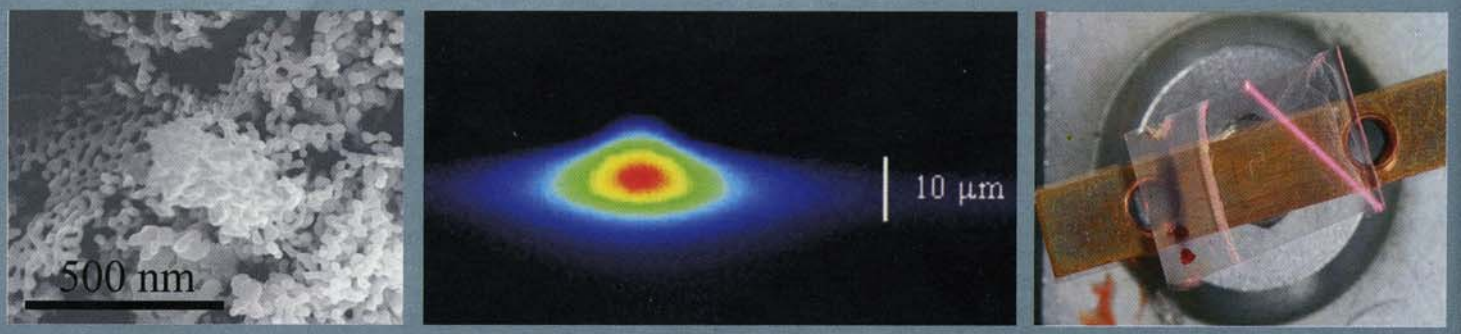
The Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy in Berlin coordinates an European consortium in the field of lasers and material research



LEFT: Scanning electron microscope micrograph of synthesized 50 nm particles of KGd(WO4)2. *Courtesy of URV, Tarragona, Spain.* MIDDLE: Experimentally recorded rib-waveguide beam profile at 965 nm, etched in a 1.7% Yb-doped KY(WO4)2 layer grown on KY(WO4)2 substrate. Courtesy of EPFL, Lausanne, Switzerland. RIGHT: Photograph of 1% Tm-doped KY(WO4)2 planar waveguide placed on a Cu-holder in the lasing state. The reddish fluorescence indicates the pump channel. This laser operates in the infrared near 2 µm. *Courtesy of MBI, Berlin, Germany*

A total of 9 institutions (6 academic and 3 industrial partners) from six European countries are collaborating in a 3-year, Euro 3.3 M Specific Targeted Research Project (STREP) called DT-CRYS. It focuses on investigating a large family of crystalline materials, the double tungstate (DT-) crystals (CRYS), which hold great promise for application in optoelectronics and in particular in the construction of lasers, as well as for optical cooling. These artificial materials with electromagnetic properties not found in nature offer new functionalities and improved performance. The project is supported by the NMP (Knowledge-based multifunctional materials) portion of the European Union's 6th Framework Programme and continues until March 2007.

The main objective of DT-CRYS is the systematic study of the synthesis, the properties (structural, thermo-mechanical, optical and nonlinear-optical, spectroscopic, magnetic, and damage resistivity), and the possible applications of the double tungstate crystals (undoped, doped and codoped, stoichiometric) in order to gain important new knowledge about their potential as multifunctional optical materials possessing both laser and nonlinear properties that can be tailored by the composition, doping, and geometry, with special emphasis on the conditions for reproducible and high-quality growth and implementation in laser devices (continuous, pulsed, ultrafast, up-conversion, self-frequency-doubled and Raman lasers) as well as for optical cooling by anti-Stokes fluorescence and magnetic cooling through adiabatic demagnetization. The manufacturing of active optical elements (of nano-crystalline, bulk, planar- and channel-waveguide, and photonic band-gap type) made of these multifunctional materials with superior parameters will enable the realization of highly efficient, diode-pumped, compact, reliable, and inexpensive processing tools for implementation in various areas.

The activities of the multidisciplinary consortium aim at establishing competitiveness of the European industry in the field of knowledge-based multifunctional materials. Nevertheless the project DT-CRYS remains basically focused on fundamental research promoting the results inside and outside the consortium. This is reflected in the dissemination policy the main platform for which is the project website www.dt-crys.net. The site describes aims and content of the project in general, lists the partners (with links) that are involved and presents the results obtained. All publications in peer-reviewed journals related to the project can be seen on the website in addition to the reports and deliverables found in the internal sector. The published papers, those in press, as well as summaries of contributions to conferences can be downloaded by the interested public from the website. The impressive scientific output of the consortium during the first two years of DT-CRYS resulted in about 60 publications in international journals with the results reported in about 75 contributions to international conferences.

More details on the European Project DT-CRYS can be found at www.dt-crys.net.

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