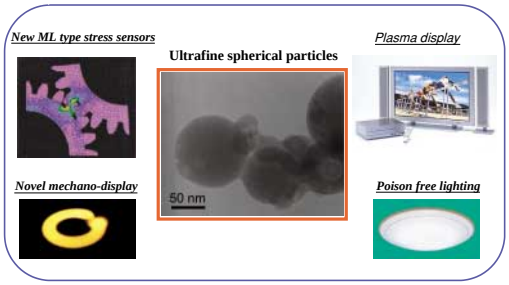
Innovation of Strong Mechanoluminescence Materials and Their Application

We have successfully innovated high mechanoluminescence (ML) materials that can give intensive visible light emission during the application of mechanical stress, the luminescence intensity of which is linearly increased with the increase of the mechanical stress in the elastic region. By developing new manufacture processes, fine ML particles with high luminosity are controllable from a size of hundreds nanometer to micrometer. These strong ML materials are promising not only for novel application such as the new stress sensors and displays to visualize stress distribution in macro and micro-scale, but also for various potential applications such as poison-free lightings and high performance plasma displays.

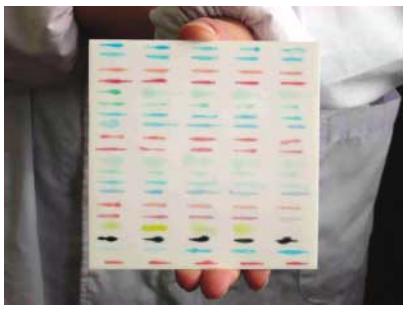


Applications of High Efficiency Phosphors

Chao-Nan XU
Institute for Structure and Engineering Materials
e-mail: cn-xu @aist.go.jp
AIST Today Vol. 2, No. 8 (2002) 13

High-Throughput Screening Technique of Thermoelectric Oxides

A high-throughput screening technique has been established for exploration of thermoelectric oxides. In this technique, 1000 samples can be prepared and evaluated their Seebeck coefficient a day. Moreover, consumed metal weight of one sample is a few 10 μg, which is smaller in the order of 10^{-5} times than the conventional technique. Using the new technique, a few n-type thermoelectric oxides have been found out.



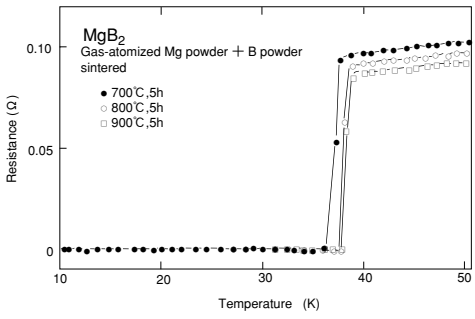
Combinatorial library on a ceramic plate

Ryoji FUNAHASHI
Special Division for Human Life Technology
e-mail:
funahashi-r@aist.go.jp
AIST Today Vol. 2, No. 9 (2002) 14

Development of Superconducting MgB_2 Tapes

The recent discovery of MgB_2 with a superconducting transition temperature Tc of 39K has much interest in various practical application such as cable. Since Mg is extremely volatile metal, powder metallurgical(PM) method is useful to produce a superconducting MgB_2.

We have succeeded in producing fine Mg powders with a diameter of below 100 μm by gas atomization. The atomized Mg powders mixed with B were heated at temperatures of 773K to 1173K and show a superconducting transition at 39K as shown in Fig. Moreover, the superconducting MgB_2 tapes were obtained by a powder - in-tube method using the powders



Change in electrical resistance of MgB_2 sintered at various temperatures as a function of temperature

Kunio MATSUZAKI
Institute of Mechanical Systems Engineering
e-mail:
k.matsuzaki@aist.go.jp
AIST Today Vol. 2, No. 9 (2002) 15