

A high-sensitive quick-response NO_x sensor

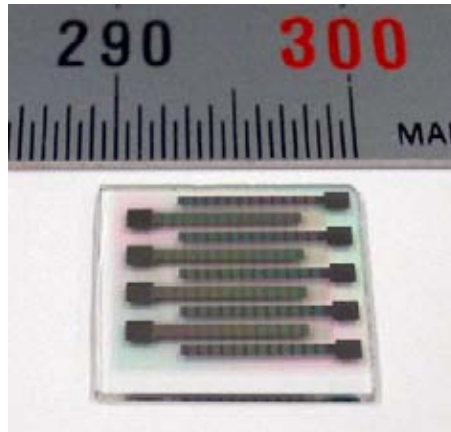
We have developed a planar type NO_x sensor with a dense sensing layer that consists of nano-size grains and a better part of reference electrode buried in an electrolyte by a pulsed laser deposition method. It shows a high NO sensitivity even at low temperature (300-450 °C). Electromotive force (EMF) values were almost linear to the logarithm of NO concentration, and the response was reproducible. The EMF was about -90 mV upon exposure to 1000 ppm of NO at 350 °C. And, the 90 % response time was found to be about 5 seconds. This cell opens up the possibilities for development of an integrated electrochemical device for NO_x gas treatment in combustion exhausts.

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The sensor array with a multilayer sensing electrode.

Electrical switches with colorful patterns by nanoparticles of pigments

Electrical color-switchable glass with Prussian blue nanoparticles was developed using wet processing. We have developed the nanoparticles of Prussian blue and its analogues, which disperse well in organic solvents. Consequently, various conventional coating and printing methods can be used in high-quality micro-fabrication to prepare electronic devices.

We examined electrochromic properties of the nanoparticle thin film fabricated by using a spin-coating on a transparent conducting oxide (TCO). The blue electrochromism was observed; the color changes between blue and colorless reversibly by applying voltage only with a 1.5 V dry battery. The electrical color-switchable glass with electrolyte sealed between two parallel TCOs was fabricated, exhibiting electrochromism even after 10,000 time operations. Various patterns can be also printed using photolithography.

Tohru Kawamoto

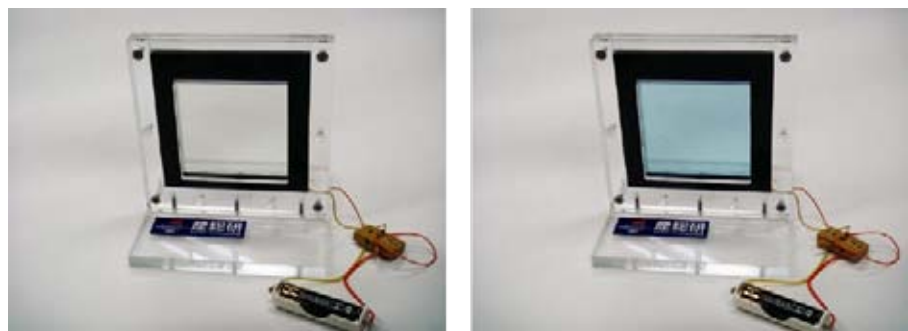
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10cm square prototype of electrical color-switchable glass (left : colorless state, right : colored state)