# Film type dye-sensitized solar cell (DSC) fabricated at room temperature

## The energy conversion efficiency of 8 % was achieved on film type DSC.

We have developed a flexible dye-sensitized solar cell (DSC) with a porous $TiO_2$ layer coated at room temperature. The DSC energy conversion efficiency of 8 % was achieved, which is the world record at present. In previous DSC related reports, it was very difficult to form a porous $TiO_2$ layer on polymer materials with good adhesion, because consolidation of $TiO_2$ nano powder required medium heating temperature of at least 400-500 ℃. In this report, the porous $TiO_2$ layer with good adhesion was obtained on a flexible polymer film by an aerosol deposition (AD) method. The AD process allows strong bonding of ceramic particles with a substrate by room temperature impact consolidation (RTIC). There was no peeling of the $TiO_2$ AD-layer during bending of the substrate. We confirmed the productivity of DSC by a roll to roll method using an AD process to reduce the manufacturing cost. Light-weight and flexible solar cells will open doors to innovative concepts of housing.

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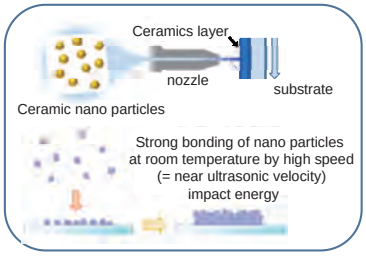
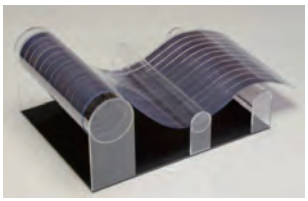



No breakage, no peeling with bending
Possible to form a strong layer

**Deposition image of the AD process**



**A sample of flexible film type dye-sensitized solar cell (DSC) (Efficiency: 8%)**



# Demonstration of the effective decontamination technique for radioactive cesium

## Extraction of 60-90 % of radioactive cesium from ash, and immobilization by an adsorbent

We have developed an effective decontamination method for radioactive cesium from combustible waste, i.e. incineration under appropriate conditions, extraction of radioactive cesium from ash, and finally uptake of cesium by an adsorbent with Prussian blue-nanoparticles. The plant-scale demonstration has been done in the Fukushima-area over the course of about a year.

In the demonstration test, combustible wastes over 10 tons have been incinerated with various conditions, resulting in 80 kg of ash. From the obtained ash, 60-90 % of radioactive cesium was extracted into water. All of the extracted cesium was immobilized by the adsorbent whose mass is 1/500-1/3,000 of the ash, and less than 1/10,000 of the initial combustible waste.

The developed technology will reduce the size of the required space for the interim storage facility for radioactive wastes.

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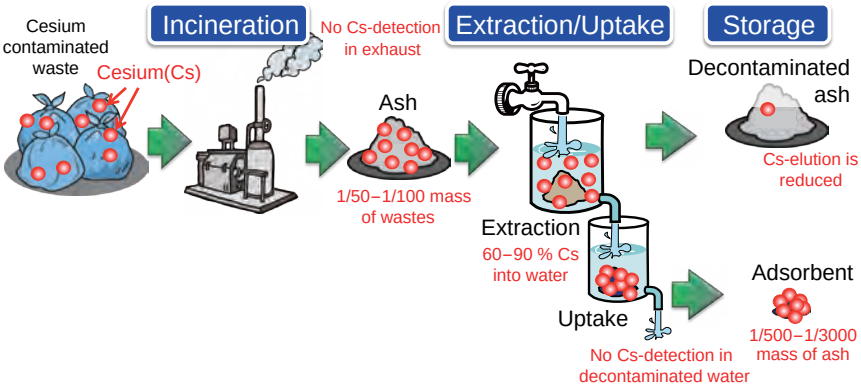


**The schematic image of the plant-scale test**