

FOR IMMEDIATE RELEASE

## **Hitachi announces development of adsorbent capable of simultaneously removing 99% of radioactive cesium and strontium**

Tokyo, April 4, 2013 – Hitachi, Ltd. (TSE: 6501, “Hitachi”) and Hitachi-GE Nuclear Energy, Ltd. (“HGNE”) today announced the joint development of an adsorbent that can simultaneously adsorb radioactive cesium and radioactive strontium dissolved in water. Developed for application to the treatment of retained water, including water containing radioactive substances generated at the Fukushima Daiichi Nuclear Power Station, the adsorbent can simultaneously remove cesium (Cs) and strontium (Sr) at a high adsorption rate of 99% or better.

The highly-contaminated waste water accumulated at the Fukushima Daiichi Nuclear Power Station contains radioactive substances, such as Cs, and sea water minerals such as sodium (Na), chlorine (Cl) and calcium (Ca). The water is currently undergoing purification through adsorption of radioactive Cs and desalination of sea water minerals using reverse osmosis membranes. The desalination process produces fresh water and brine. The brine, which includes a small amount of radioactive Cs and a high-concentration of radioactive Sr, is stored in tanks in liquid form. To prevent the scattering of radioactive substances in the event of water leakage, it is desirable however that the radioactive Cs and Sr be removed from the stored water.

Hitachi and HGNE have applied a special treatment to titanate compounds\*<sup>1</sup> to develop an adsorbent that can simultaneously remove Cs and Sr at a high adsorption rate. Used in the upstream process of desalination treatment or in the brine treatment process, the adsorbent can remove radioactive Cs and Sr from the waste water with half the quantity of conventional adsorbents.

The newly developed adsorbent has the following characteristics:

### **(1) Simultaneously adsorbs Cs and Sr**

Belonging to different groups on the periodic table of elements, Cs and Sr differ from each other in terms of electrical charge and ionic size when dissolved in water. This has conventionally made it necessary to use a different type of adsorbent for removing Cs and Sr. The newly developed adsorbent exhibits high adsorption performance for Cs and Sr, and is capable of simultaneously removing Cs and Sr contained in the water to be treated.

### **(2) Maintains adsorption performance through high selectivity**

Na and Ca, which are sea water minerals contained in the waste water, have similar chemical properties to Cs and Sr, respectively, and are adsorbed by an adsorbent in a similar manner. Thus, the adsorption performance of conventional adsorbents for Cs and Sr tend to decrease under sea water conditions. In contrast, the newly developed adsorbent exhibits a property that selectively adsorbs Cs and Sr, and thus maintains high adsorption performance even under sea water

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conditions.

**(3) 99% or better adsorption of Cs and Sr**

The newly developed adsorbent has excellent selectivity and adsorption performance for Cs and Sr, making it possible to efficiently adsorb and remove Cs and Sr. Experiments to remove Cs and Sr from water simulating the composition of the waste water, has confirmed that the new adsorbent has a 99% or better adsorption rate of Cs and Sr from water 3,000 times its cubic content. Appropriate use of this adsorbent would enable easier removal of radioactive Cs and Sr from the water to be treated than before, even as good as to satisfy the new standards for drinking water established by the Ministry of Health, Labour and Welfare of Japan\*<sup>2</sup> (radiation dose of 10 becquerel per liter (Bq/L) or less).

The Hitachi Group will take advantage of the characteristics of the newly developed adsorbent and other various adsorbents to provide customers with the ultimate solutions for treating a variety of contaminated water, including contamination by radioactive substances. Through such endeavors, the Hitachi Group remains committed to contributing to the settlement of the accident at Fukushima Daiichi Nuclear Power Station and the reconstruction of the neighboring areas.

**Notes**

- \*<sup>1</sup> Titanate compounds: Chemical compounds comprised of titanium, oxygen and other elements
- \*<sup>2</sup> New standard by the Ministry of Health, Labour and Welfare of Japan: Standard enforced in April 2012 that sets the upper limit of radiation dose of food, established on the basis of the radiation dose of 1 millisievert (mSv) per year

**About Hitachi, Ltd.**

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, is a leading global electronics company with approximately 326,000 employees worldwide. The company's consolidated revenues for fiscal 2012 (ended March 31, 2013) totaled 9,041 billion yen (\$96.1 billion). Hitachi is focusing more than ever on the Social Innovation Business, which includes infrastructure systems, information & telecommunication systems, power systems, construction machinery, high functional material & components, automotive systems and others.

For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

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