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Australian Nuclear Science and Technology Organisation

## Media Release

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# Toxic waste removal technology awarded US Patent

A unique Australian, ion-exchange technology platform, that can remove a range of toxic radioactive and non-radioactive heavy metals including, lead, silver and caesium from industrial processing solutions resulting from nuclear and minerals activities, was recently granted a patent in the United States.

The materials ANSTO\* have discovered and developed are similar to the adsorbents used in the petrochemicals industry and domestic water treatment plants, except they can operate in highly aggressive environments.

The patent represents a major milestone for this breakthrough technology, opening up commercial opportunities in the mining, chemical and nuclear industries to help manage toxic wastes, said Dr Victor Luca, inventor of the technology and Research Leader of ANSTO's project on Advanced Materials for Energy Applications.

"The invention can significantly improve the methods by which toxic waste is processed for either storage or recycling," explained Dr Luca.

"The technology is a metal oxide material containing atomic scale channels that are akin to a common kitchen sieve, which is where the analogy ends," he said. "These molecular sieves display such exquisite selectivity for certain metallic atoms that they can pluck them out of the most highly acidic solutions containing massive concentrations of other elements.

The ion-exchanger is initially prepared in the form of very fine fibres that are nanometers in width and microns in length. However, Dr Luca and his team have engineered these microscopic fibres into the form of millimetre sized beads with no loss in performance. The outward appearance of the beads is similar to the ones you would find in an ordinary domestic water filtration system usually under the kitchen sink, except the ANSTO beads are blue and more specialised, so they remain stable to perform in highly acidic conditions.

"The technology, which was originally developed for dealing with the radioactive waste ANSTO generates during the production of medical isotopes, can also be used for the decontamination of solutions involved in uranium and copper mining operations as well as help manage the waste streams from nuclear power production in other parts of the world" he said.

"Once the pale blue ion exchanger beads are saturated in the toxic metals they can either be reused or heated and converted into highly stable beads with a bronze appearance. The bronze beads produced by heating the spent ion exchanger are stable for very long periods of time.

"All in all this new technology is a major breakthrough in removing nasties from certain solutions and will definitely have environmental benefits in the long term as it will help improve current processes."

ANSTO is trialling the materials in partnership with industry and is keen to develop the technology for commercial use.

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**For more information please contact ANSTO Media Relations Manager, Sharon Kelly, on (02) 9717 9575 or 0400 394 085**

\*ANSTO is the Australian Nuclear Science and Technology Organisation - the country's national nuclear research and development organisation and the centre of Australian nuclear expertise.