

# Waste deep in new opportunities

Improved technology and environmental demand has driven secondary raw materials made from recycled waste further into the mainstream, says **Mike O'Driscoll**, who reports on a major conference on developments

The industrial mineral recycling business has gathered momentum dealing with common challenges regarding slags, spent refractories, construction waste and waste electrical and electronic equipment. The upshot has been the emergence of new opportunities to develop mineral products from waste for a range of applications.

Rotterdam was again the setting for IMFORMED's second Mineral Recycling Forum, held in March, bringing together leading players in the fast-evolving secondary raw materials sector.

Magnus Gislev, policy officer for resource efficiency and raw materials at the European Commission (EC), spoke about EU policies on mineral recycling and the circular economy, setting out the EC's extensive raft of policies and initiatives on the circular economy. Central to this is the €650m Horizon 2020 fund for raw materials initiatives which includes recycling.

Gislev highlighted the 2030 Sustainable Agenda, the Paris Agreement to combat climate change and the G7 Alliance for Resource Efficiency. Industry has a key role in committing to sustainable sourcing and co-operation across value chains, he insisted.

EIT RawMaterials, launched and funded by the EC, is the largest consortium in the raw materials sector worldwide, uniting more than 100 partners - academic and research institutions, as well as businesses - from more than 20 EU countries.

### Raw material competitiveness

Thematic officer for substitution and recycling Dr Roland Gauss explained EIT RawMaterials' mission - to boost competitiveness, growth and attractiveness of the European raw-materials sector. Several projects included the development of fly ash for flame retardants to unlock vast amounts of high-value minerals from fly ashes.

Dr Liesbeth Horckmans, a researcher at VITO, explained how VITO was active in 140 projects, mapping reuse possibilities from waste materials and developing solutions for mineral waste. Construction and demolition waste (C&DW) is one of the most important waste streams in the EU, with 500 to 1,000 million tonnes per annum generated, said Horckmans.



Mineral recycling experts share their knowledge

Christine Marlet, secretary general of Eurogypsum, meanwhile said: "Gypsum is 100% recyclable. You can always reuse gypsum because the chemical composition of the raw material in plasterboards and blocks always remains the same."

### Co-operative business model

Marlet highlighted how gypsum-to-gypsum project partners from eight countries had created a co-operative business model for recycling C&DW, among other gypsum-based waste. The model is established in the UK, France, Scandinavia, Belgium and the Netherlands and the two main drivers for gypsum recycling are the difficulty in accessing primary raw material and the decline in flue-gas desulfurisation gypsum as coal combustion plants close.

Eunan Kelly, business development manager for CDE Global, said that increasing urbanisation means we consume around 50 billion tonnes per annum of sand. Until recently, processes for recycling sand failed to deal with lightweight contaminants, organics, clay contamination and high fines content.

CDE Global has evolved an advanced recycling process incorporating aggregate screening, scrubbing and sizing, sand washing and classification, primary stage water treatment and sludge management. Projects are diverting more than 13 million tonnes of C&DW from landfill every year with plants across the UK, Germany, Norway, Australia and India.

Dr Erwan Guéguen, technical director at Magnesita Refractories, reviewed the key refractory minerals consumed and how their prices have trended mostly upwards in recent years helping to drive recycling. "Raw materials represent 40 to 50% of the cost of refractories, and China is currently the main supplier of a high volume of important refractory grade raw materials," he said.

Dr Christian Engelsen, senior research scientist at the Foundation for Scientific and Industrial Research took the audience through aluminium and cement production lessons learned in co-processing technology and the potential for using spent pot linings (SPL) in cement production.

About 58Mt of aluminium were produced in 2015, which generated some 1.45Mt SPL. Engelsen explained that co-processing in cement manufacture was partly substituting the coal fuel with alternative fuel and the raw materials with alternative raw materials, such as SPL.

### Slag technology development

Nick Jones, development manager at Harsco Metals Group reviewed milestones in developing slag technology. Jones noted that while across the world slag was referred to differently as waste, by-product or product, it was a high-quality global resource. He highlighted environmental and quality challenges, and the dire consequence of material failure.

Mark Tilley, a vice-president at Lixivia moved the agenda up a notch to look at recycling added-value products from steel and other wastes. "We think of industrial mineral waste as an opportunity to reconfigure existing supply chains and broaden the circular economy using chemistry" he said.

In 2013, Lixivia invented a chemistry and process called SELEX to improve productivity, enable refining and develop new mineral sources that existing technology could not provide. The company is now working with partners to scale this technology. Projects include precipitated calcium carbonate, magnesia, rare earths, and lithium. ■

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