New Dynamic Brass Stock-and-Flow Model Illuminates Dilution of Lead Content in Copper Alloys

The International Copper Association (ICA) has announced new research from Fraunhofer ISI that models the global flow of leaded brass through time with unprecedented detail. Crucially, the model enables calculation of quantitative scenarios for the future of lead content in brass on a global scale.

Dynamic stock-and-flow models for copper are available at the global and regional level, however, in the past, these have not tracked alloying metals such as zinc, tin or lead. With questions now being raised about lead—making it a target for more restrictive regulations, which have potentially significant implications for industry—incorporating these alloying metals into stock-and-flow models is an important step.

'The model tracks brass through time, and is based on the best available data, both public and proprietary,' says Colin Bennett, Global Manager, Market Analysis and Outreach, ICA. 'This ensures a much-improved understanding of how brass is used and reused by society, and thus increases the transparency of lead flows at the global level.'

The study examines the life cycle of brass in exceptional depth, from primary material production, through the production of semi-finished goods, to the fabrication of end-use products. At the close of the life cycle of end-use products, the brass becomes part of the 'urban mine,' and is either recycled or becomes waste, ending up in landfill, incineration, or other recycling loops.

Plotting Theoretical Scenarios of the Dilution of Lead

The detailed accounting of brass flows at each stage of the life cycle is what makes this model especially valuable, allowing for a better understanding of where and in what quantities lead enters and exits the cycle.

The new model enables the plotting of different scenarios for leaded brass, which—until now—have been missing. For example, using the research, forecasts could be made of the impact of a reduction in primary lead input into copper alloys, or of an increase in end of life scrap being smelted rather than re-melted, or a combination of both. Exploring theoretical dilution scenarios is an essential step towards evaluating the practical impacts of lead reduction on manufacturing processes and end-use applications.

'The model provides insight into where changes might be most effective,' explains Dr. Luis Tercero Espinoza, who led the research team at Fraunhofer ISI and supervises the institute's research topic Materials and Raw Materials. 'Whether impactful dilution is possible without changing recycling routes, or whether there needs to be a systematic reduction in the amount of directly re-melted leaded end of life alloy scrap in semis production, the model is a major step in understanding the multiple scenarios possible.'

Further information will be presented in the ICA workshop and panel discussion at the World Copper Conference, 9–11 April 2018, during CESCO Week in Santiago, Chile.

About the International Copper Association (ICA)

ICA brings together the global copper industry to develop and defend markets for copper and to make a positive contribution to society's sustainable development goals. Headquartered in Washington, D.C., ICA has offices in four primary regions: Asia, Europe and Africa, Latin America and North America. Copper Alliance programs and initiatives are executed in nearly 60 countries through its regional offices. For additional information, please visit www.copperalliance.org.

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