

EUROMAT 2017/ Symposia Structure/Area H

Title: Materials Life Cycle Approach and Flow Analysis		
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Summary		
H.3	<p>With the growth of the world population, the development of societies and the increase of world-wide economic activity, human needs for materials e.g. for construction, food, transport, health care and communication increase. The mining, extraction, processing, production, use, and disposal of these materials have a severe impact on the local and global ecology and influence also the economic environment. To assess the environmental impact of specific products, it is necessary to take a broad view and consider all stages of the value chain, that is, from cradle to grave. Techniques such as Life Cycle Assessment (LCA) allow for a broad environmental evaluation of a material or product by compiling an inventory of relevant energy and material inputs and environmental releases, and assessing the impact caused by those. These inventory flows include inputs of water, energy, and raw materials, and releases to air, land, and the hydrological cycle. To develop such an inventory, models using data on inputs and outputs are constructed, considering all activities within the system boundary and the product's or material's supply chain. In a Life Cycle Analysis, the endpoint categories usually relate to specific areas which should be protected, namely human health, natural environment, and natural resources. However, discussions are ongoing whether other impact, such as socio-economic implications of materials criticality, should also be taken into account. This is of high relevance for European companies in view of legislation, possible price volatilities and supply chain risks.</p>	
	<p>As raw materials have a natural limitation in their availability, and since extraction and transport often have a large ecological impact, the potential of exploiting the "urban mine" has received greater attention lately. Scientists, industries, and governmental bodies worldwide begin to rethink how to extract valuable materials by recycling and finding solutions for a circular economy. To know about occurrence and content of these urban mines, the stakeholders need a systematic method to keep track of and display stocks and flows of the materials entering, staying within and leaving the different processes of the anthroposphere. The quantification of flows and stocks of materials, e.g. for a certain sector, in a certain ecosystem or by a specific population, can be done by materials flow analysis (MFA). Since products used in Europe are often manufactured off-shore, their composition and origin is not always specified in detail. A global view and increased transparency is thus indispensable for a proper assessment of materials' and products' ecological impact, and for enabling informed and sustainable decisions.</p>	
	<p>The ESM session aims at showing different approaches to gather a holistic view on products, their raw materials and the related environmental and social impact, and to acquire and aggregate the necessary knowledge. Thus, contributions on different angles and methodologies are welcome – besides life cycle assessment and materials flow analyses also related and modified approaches such as criticality analyses, life cycle sustainability assessment, value-chain mapping, economic input-output LCA, or socio-economic assessment.</p>	