MMAtwo: New innovative process for recycling end-of-life PMMA wastes.

Jean-Luc Dubois (Arkema), jean-luc.dubois@arkema.com.

Bullet points:

- EU project on post-consumer and post-industrial PMMA wastes, covering the whole value chain;
- Technology to enable recycling of lower quality wastes and post-consumer products, through selective depolymerization back to the monomer MethylMethacrylate
- Demonstration with cast sheets, caravan window and kitchen sink from recycled monomer.
- Preliminary Life Cycle Analysis and Benchmark of technologies
- Consolidation of active players along the value chain.

The MMAtwo project, coordinated by the Dutch company Heathland supported by a 6.6 M€'s funding from the European Union Horizon2020 Research and Innovation programme, started on October 1st 2018 for a 4 years duration. PolyMethyl MethAcrylate (PMMA) is a well-established polymer known for its optical properties. About 300 000 tons of PMMA are produced in Europe every year, or close to 1 billion Euro of market value. Although PMMA can be turned back into its monomer by thermal depolymerization, thus saving precious resources and CO_2 emissions, it is estimated that currently only 30 000 tons of waste is recycled annually in Europe, or only around 10% of the yearly production. For a large part, recycling of PMMA is currently reliant on a lead-based process which does not allow to reprocess the lower PMMA qualities.

MMAtwo's innovative concept for PMMA waste recycling through depolymerization focusses on handling both post-industrial and contaminated end-of-life PMMA waste. The main results achieved so far include:

- an increased collection of PMMA wastes from partners: **Heathland** (Project Coordinator), a Dutch collector and recycler of PMMA waste; **Comet Traitements**, a Belgian recycler of end-of-life vehicles; **Ecologic**, a French association to facilitate recycling of WEEE's;
- preliminary depolymerization tests at kilogram scale and modelization of the radical mechanism by **Arkema** (Executive Board and Advisory Board chair), a French PMMA producer and **University of Gent**, a Belgian academic partner to train researchers on polymer recycling;
- Preparation of the pilot depolymerization unit by ; **JSW Europe**, a German based division of Japan Steel Works and core technology provider;
- Purification trials of the recycled monomer by **Speichim** (part of Séché-Environnement group, French leader of waste treatment), a French based specialist in purification of solvents and chemicals; and odour analysis by **Certech**, a Belgian applied research center in chemistry, specialised in emissions and odours of materials and polymer recycling standards;
- Trials on recycling glass fibers and recycled monomers by **Arkema** and **Delta Glass** (part of Polyplastic Group), a Dutch producer of PMMA windows;
- Recycling of glass fibers and recycled monomer and polymer into kitchen sinks by **Plados Telma**, and Italian producer.
- Preliminary LCAs and economics analysis with **Quantis**, a Swiss based specialist in Life Cycle Analysis; **Process Design Center**, a Dutch SME for process development, integration and optimization;
- With the support of **Ayming** a French consulting group supporting the project management, communication and dissemination activities.

MMAtwo's **Advisory Board** includes several academics, CEFIC's Methacrylate sector group and other PMMA producers' representatives, illustrating the commitment of the PMMA value chain. **Acknowledgement**This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 820687.