Novel glass container defect removal for meeting net-zero carbon targets

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Project summary

Glass containers are perfect for reuse, being non-toxic, long-lasting, durable, and corrosion resistant. During daily use, glass surfaces inevitably suffer from wear and damage: these defects greatly reduce the strength and service life of the container so even when returned and reused, glass containers must ultimately be recycled. Preliminary findings indicate that the defects which form have unique characteristics, each associated with different causes. This work seeks to characterise these different defects, identify the causes and understand their impact on glass strength and suitability for return and reuse, as opposed to recycling (re-melting). This project aligns with UK Government strategy through UK glass container lifecycle models for Net-zero carbon emissions and sustainability. It will contribute to future research to adopt innovative methods to eliminate glass defects and provide early stage data and evidence for external funding support from Innovate UK or EPSRC.

The intern will be trained in, and utilize, multiple analytical techniques within MERI (including SEM/EDS, Digital microscope, 3D Optical Profilers, and AFM) to characterise and classify container glass defects (samples will be collected from the marketplace and industrial partner sites). The intern will understand and identify at which stage in the production and circulation flow of glass containers different defects are generated. They will use Griffith crack theory to quantitatively analyse the impact of defects on mechanical strength and integrity of glass containers. This will support career development of the intern, whilst also expanding horizons and offering opportunities to engage and interact with industrial partners.

Specific skills and experience required for this project

Please also refer to the advert on our jobs pages for the person specification for these internships

The ideal candidate will be able to demonstrate logical and organized thinking, with a certain level of interest in materials science, manufacturing, energy and / or the circular economy. They should be willing to communicate and eager to explore, with a good understanding of scientific methods and experimental procedures. A background in materials science, chemistry, physics, engineering, or a related physical science field is preferred but not essential. The ability to write reports and summarize data and results is required. Knowledge of analysis methods and materials characterization would be helpful but will also be developed during the internship. The intern does not need to have prior experience in the analytical techniques mentioned in the field, but they will

need to learn during the internship. They should also be willing to travel upon occasion to visit the project industrial partners.

Project location

City Campus

Home working may be available

Project delivery

The project is anticipated to take six weeks to finish on a full-time basis. However, if the intern would rather work part-time, this is open to discussion.