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# Recycling-based contaminants in glass production and how to avoid them

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## Abstract

Results of a research project (IGF/Aif-Forschungsvorhaben Nr. 21222 N)  
Cullet is by far the most important batch material in contemporary container glass production: Almost 90% of the container glass batch can consist of recycled glass. This leads to considerable savings in both, energy, and raw materials.

However, one undesired side effect of recycling is the possibility of contaminant enrichment within the material cycle. Such components are introduced into material cycles by pollutants of often unknown origins – such as lead or mercury from labels, dyes, undesired glass types or dirt on cullet surfaces. This enrichment can increase over time and lead to poor product quality or violation of emission limits.

In our project, funded by the IGF and the BMBF as project 21222N, we investigated the enrichment of such contaminants, and especially lead and mercury. Both are strictly limited in the final product: Lead is incorporated into the glass matrix and may lead to violation of food safety rules. Mercury, as a more volatile element, can reach critical levels in the emissions over the glass melt and may thus violate the legal requirements.

While the main source for both toxic elements is cullet, mercury is a common contaminant of other batch raw materials, e.g. dolomite and feldspar. In both cases, the contaminants are difficult to remove, and may require dilution over time with low lead / mercury raw materials.

In our project, we performed time resolved measurements of critical components and could thus identify critical components for pollutant enrichment. As a result, a new type of sample collection for mercury could be applied in the glass industry.

The calculations, analysis and measurements are carried out within the project ‘Anreicherung’ with the AiF/IGF no. 21222 N, supported by the federal ministry for economic affairs and climate action (BMWK) on the basis of a decision by the German Bundestag.

**Keywords:** recycling, cullet, lead, contamination

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