# Higher recycled contents in Al foil alloys for food-packaging applications: How about surface chemistry and adhesion ?

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Due to their outstanding barrier function, among others, Al foils are an integral part in food-packaging applications such as aseptic liquid packaging and lidding material. Based on ambitious sustainability targets, there is a growing need for an increase of recycled content in Al foil alloys used for such applications, with the aim to reduce their Carbon footprint.
Previous studies have mainly focused on the recycling of packages and compound materials made from Al foil as well as on the remelting of recycled Al from these packaging applications. [1,2] Towards the goal of closed-loop Al recycling, however, future Al foil alloys need to allow for higher scrap intake. This may require less tight tolerances on alloying-elements levels.
We have performed coating trials as well as aging and adhesion testing on today´s state-of-the-art Al foil in comparison to a more recycling-friendly alloy composition. The present study investigates the impact of higher alloying-elements' levels on the surface properties of flat-rolled Al foil. In addition, adhesion properties of lacquered Al foil are evaluated, and potentially critical parameter sets for end-customer applications, which may lead to a decrease in sealing strength, for instance, are identified. The results are discussed in the light of possible failure mechanisms.

[1] Frank Riedewald et al., Waste Management, 138 (2022), 172–179, Recycling of aluminium laminated pouches and Tetra Pak cartons by molten metal pyrolysis – Pilot-scale experiments and economic analysis.

[2] Yixuan Cao et al., Composites Part A, 194 (2025), 108887, Upcycling aluminum plastic packaging waste into high thermal conductivity and fire safety composite.