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# What have the Romans ever done for us? Two thousand years of glass recycling

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## Abstract

Urban waste was already a problem in ancient times, and massive landfills are not just a modern phenomenon. Considering the vast quantities of glass used in Roman buildings, however, the amount of glass that has ended up in the archaeological record is surprisingly small. This discrepancy is partly explained by the suitability of glass for recycling, which was extensively practiced since at least the first century CE. Glass recycling gained importance in late antiquity and the early Middle Ages, when the supply of raw glass from the eastern Mediterranean became more difficult and therefore more expensive for political and economic reasons. There is evidence of glass recycling from written sources, archaeological remains and especially compositional characteristics. The chemical analysis of archaeological glass assemblages from the Roman period to the Middle Ages shows evidence of systematic recycling in the form of mixtures of different raw glass compositions, the accidental incorporation of coloured cullet (broken glass) that increases the concentrations of some of the transition metals not otherwise present in the silica source, a loss of volatile elements and/or contamination of the glass batch by the furnace environment, glass-working tools or fuel. This presentation will discuss the existing evidence for glass recycling during the first millennium CE, focusing primarily on the effects of glass recycling on the composition of archaeological glass and its implications.

**Keywords:** archaeology, LA, ICP, MS, transition metals, cobalt, antimony, contamination

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