

Supplementary information for

## **Regional contamination patterns of glass recycling in medieval Tusculum (Italy)**

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### **This PDF file includes:**

Figures S1, S2, S3, S4  
Data sources (references)

Other supplementary materials for this manuscript include **Dataset Table S1 & standards (excel file)**

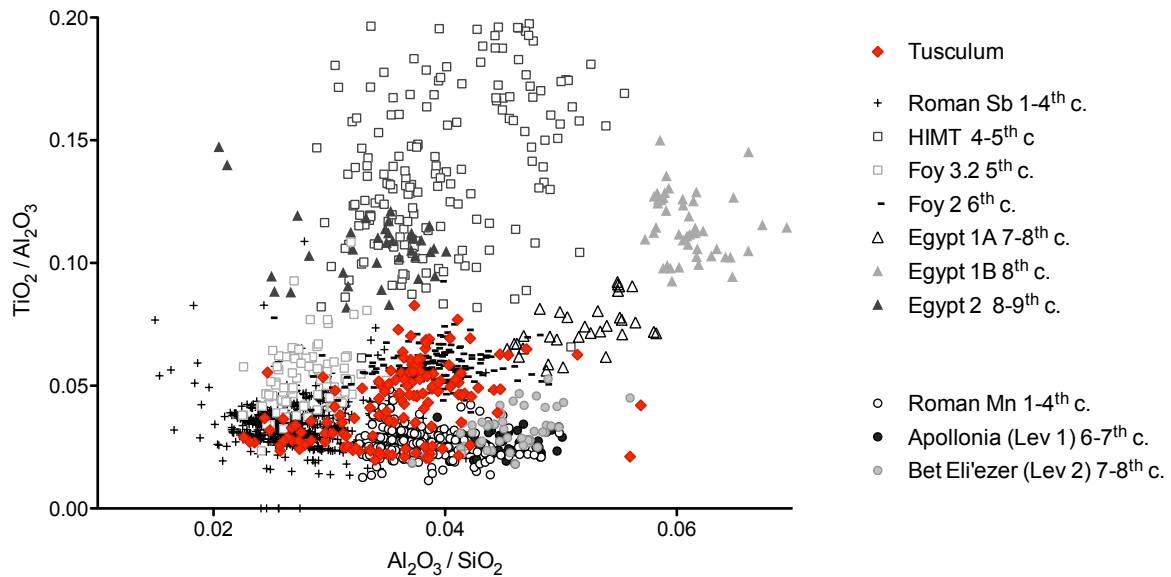


Fig. S1: Comparison of the natron glass from Tusculum with all known natron-type primary glass groups of the first millennium CE based on  $\text{Al}_2\text{O}_3/\text{SiO}_2$  and  $\text{TiO}_2/\text{Al}_2\text{O}_3$  ratios. Data sources: (Baxter *et al.*, 2005; Degryse, 2014; Gratuze, 2018; Paynter, 2006; Silvestri, 2008; Silvestri *et al.*, 2008) for Roman Sb; (Degryse, 2014; Gratuze, 2018; Jackson and Paynter, 2016; Schibille *et al.*, 2012; Schibille *et al.*, 2017; Silvestri, 2008; Silvestri *et al.*, 2008) for Roman Mn; (De Juan Ares *et al.*, 2019; Foster and Jackson, 2009; Freestone *et al.*, 2018) for HIMT; (Ceglia *et al.*, 2019; Foy *et al.*, 2003; Schibille *et al.*, 2016) for Foy 2; (Balvanović *et al.*, 2018; Cholakova and Rehren, 2018; Foy *et al.*, 2003; Gallo *et al.*, 2014; Maltoni *et al.*, 2015) for Foy 3.2; (Schibille *et al.*, 2019) for Egypt 1 & Egypt 2; (Freestone *et al.*, 2008; Phelps *et al.*, 2016) for Levantine 1; (Brems *et al.*, 2018; Freestone *et al.*, 2000; Freestone *et al.*, 2015; Phelps *et al.*, 2016) for Levantine 2.

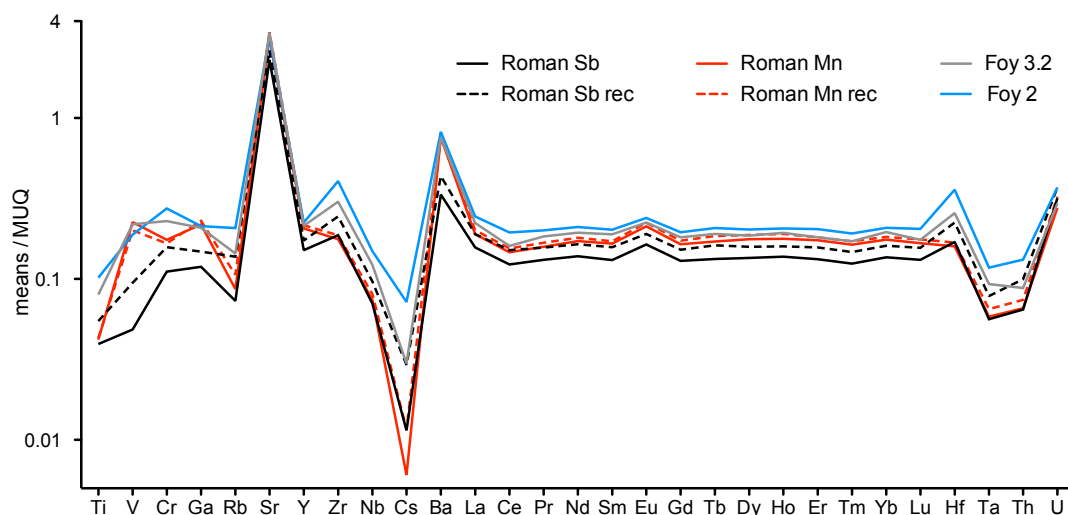


Fig. S2: Averages of trace elements of the all subgroups identified at Tusculum normalised to the upper continental crust (Kamber *et al.*, 2005).

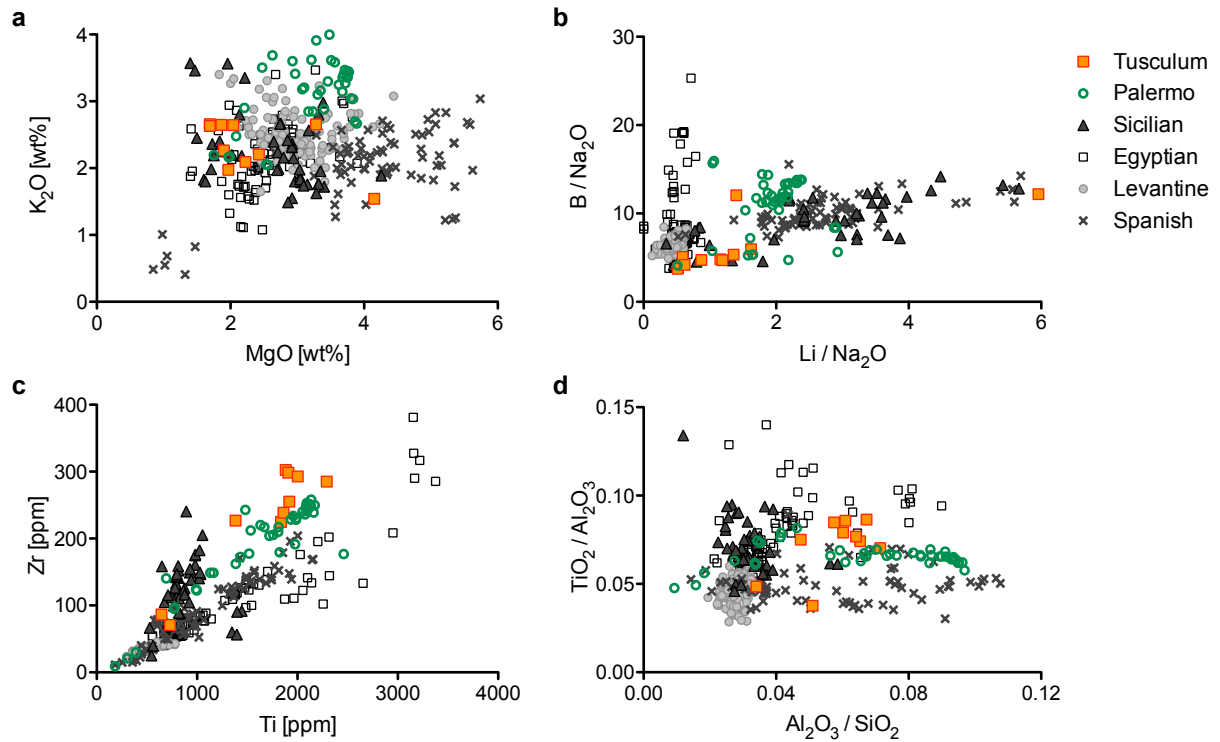


Fig. S3: Soda-rich plant ash glass samples from Tusculum compared to regional soda-ash glass groups. Data Sources: (Colangeli, 2021; Schibille and Colangeli, 2021) for Palermo and Sicily; (Rosenow *et al.*, 2018) for Levantine; (Schibille *et al.*, 2019) for Egyptian; (De Juan Ares and Schibille, 2017) for Spanish glass.

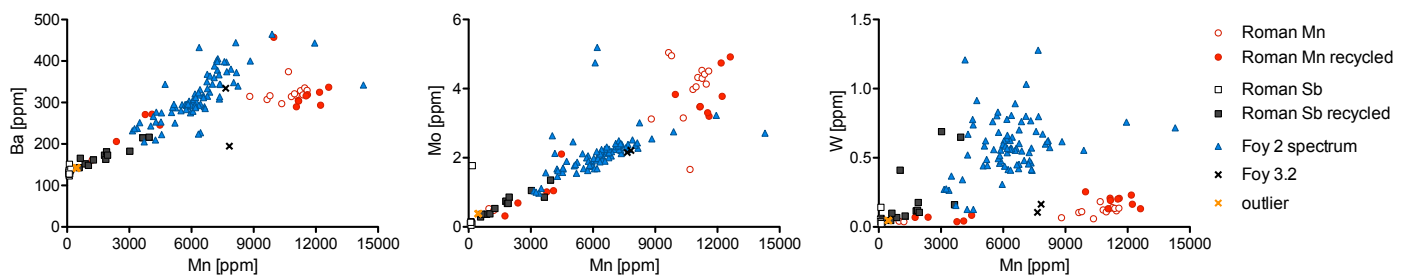


Fig. S4: Trace elements that show intercorrelations with manganese depending on the base glass type. Mn is strongly correlated with Ba and Mo in the Foy 2 glass, less so in the Roman Mn group, while W is elevated but not correlated with Mn in the Foy 2 group.

## Data Sources

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