Gold enrichment in Staffordshire Hoard K652: results of SEM-EDX analysis

Object Type Mount
Date 625-650

Decoration Filigree ☐ Glass ☐
Garnet ☐ Other ☐

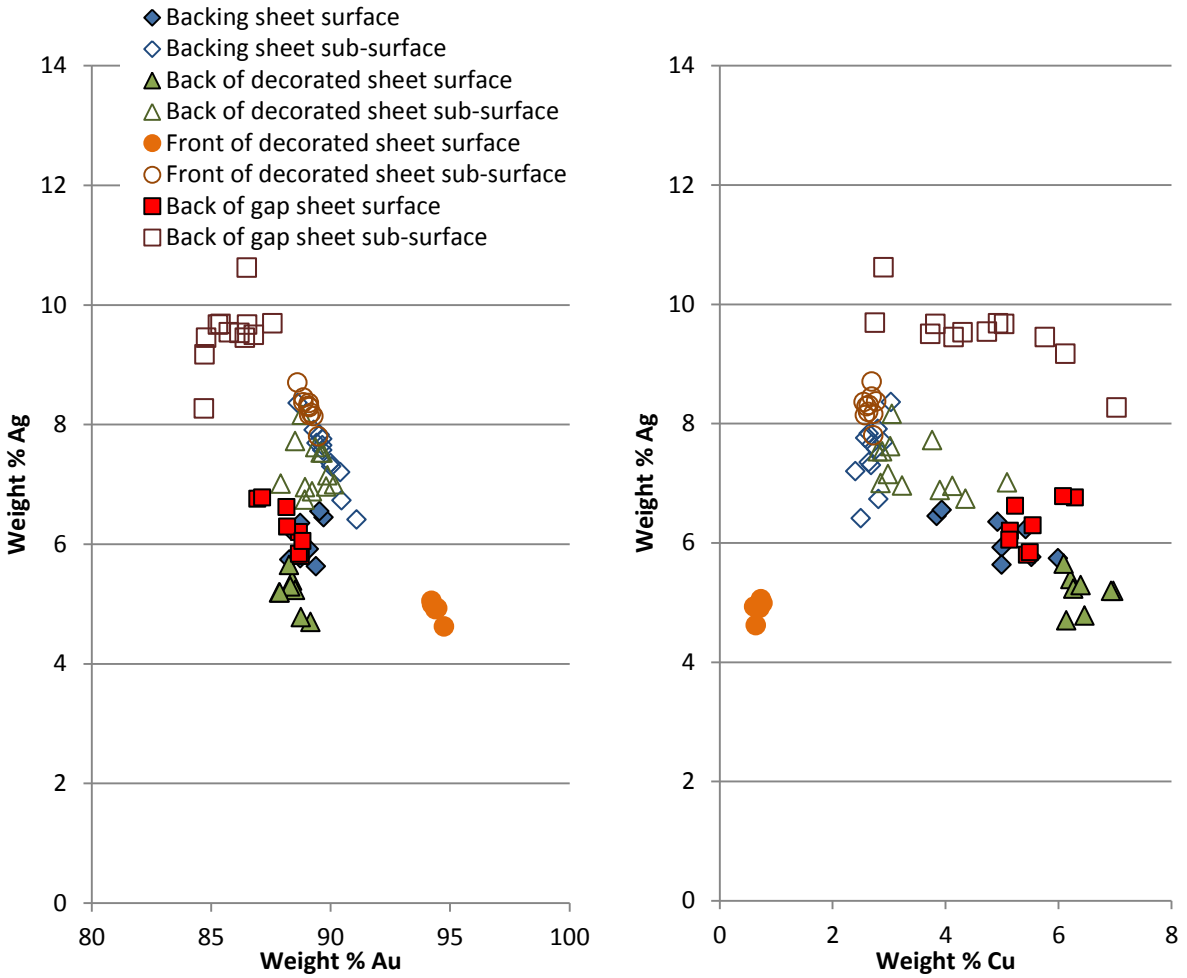
SEM-EDX analysis was undertaken on the backs of the backing sheet, the decorated sheet and the sheet that fills the gaps between motifs.

Area analysed	No of analyses		Wt% Au	Wt% Ag	Wt% Cu
Backing sheet surface	8	Average	89.5	6.5	4.0
		Standard Deviation	*1.01*	*0.75*	*1.58*
Backing sheet sub-surface	12	Average	89.5	7.2	3.3
		Standard Deviation	*0.50*	*0.82*	*0.88*
Back of decorated sheet surface	8	Average	88.6	6.0	5.4
		Standard Deviation	*0.53*	*0.97*	*1.16*
Back of decorated sheet sub-surface	12	Average	89.1	6.7	4.2
		Standard Deviation	*0.75*	*1.16*	*1.70*
Front of decorated sheet surface	6	Average	94.4	4.9	0.7
		Standard Deviation	*0.19*	*0.15*	*0.06*
Front of decorated sheet sub-surface	10	Average	89.0	8.3	2.7
		Standard Deviation	*0.24*	*0.23*	*0.07*
Back of gap sheet surface	8	Average	86.8	7.9	5.3
		Standard Deviation	*1.55*	*1.78*	*0.63*
Back of gap sheet sub-surface	12	Average	86.8	8.4	4.8
		Standard Deviation	*1.40*	*1.67*	*1.33*

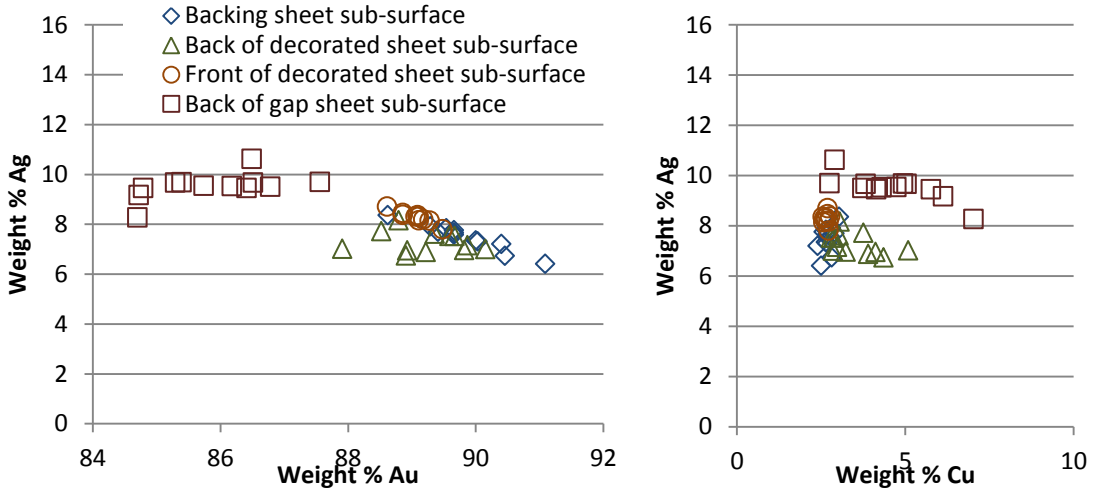
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed an increase of copper on the back surfaces of the sheets; this is possibly due to the presence of solder. This was confirmed by the repeat analysis of the front of the decorated sheet which showed the typical loss of copper most likely indicative of corrosion that can occur during burial which results in natural surface enrichment. The analysis also revealed a *c*.0.5-0.7 wt% loss of silver from the surface (a difference of 6-10% from surface to core), most likely indicative of corrosion that can occur during burial which results in natural surface enrichment but could also be the result of some deliberate surface treatment.

Comparison of the sub-surface compositions of the backing sheet and the front decorated sheet suggests that they may have used the same, or a similar, gold alloy. The sheets used to fill the gaps on the other hand appear to be a distinctive composition, and are therefore a different gold alloy, and may therefore have been a later modification.



Plots of gold *vs* silver and copper *vs* silver contents, based on SEM-EDX analysis, showing the differences between the sub-surface and surface analyses.



Plots of gold *vs* silver and copper *vs* silver contents, based on SEM-EDX analysis, showing the differences between the sub-surface analyses of each component analysed.

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Analysed October 2013