

Supporting Information

Galvanic Replacement of the Liquid Metal Galinstan

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Table S1. EDX analysis of black silver formed in AgNO_3 aqueous solution of various concentrations.

AgNO_3 concentration (mM)	Ga (%)	In (%)	Sn (%)	Ag (%)	O (%)
0.1	33.5	2.5	1.1	2.9	60.0
0.5	28.0	1.9	4.0	10.7	55.5
1	26.9	3.0	0	11.2	58.9
5	13.3	1.5	0.9	51.4	32.9

Table S2. EDX analysis of black gold formed in KAuBr_4 aqueous solution of various concentrations.

KAuBr_4 concentration (mM)	Ga (%)	In (%)	Sn (%)	Au (%)	O (%)
0.1	57.2	12.7	7.3	0.6	22.1
0.5	29.1	9.7	0	21.8	39.4
1	22.1	0.5	0.7	47.3	29.5
5	18.7	0.2	0	55.6	25.4

Table S3. EDX analysis of the nanocomposite obtained via sonication in an aqueous solution of various metal precursors.

	Ga (%)	In (%)	Sn (%)	Ag (%)	Au (%)	O (%)
5 mM AgNO_3	31.7	1.6	1.2	4.5	-	61.1
1 mM KAuBr_4	37.9	2.3	2.6	-	5.2	52.1

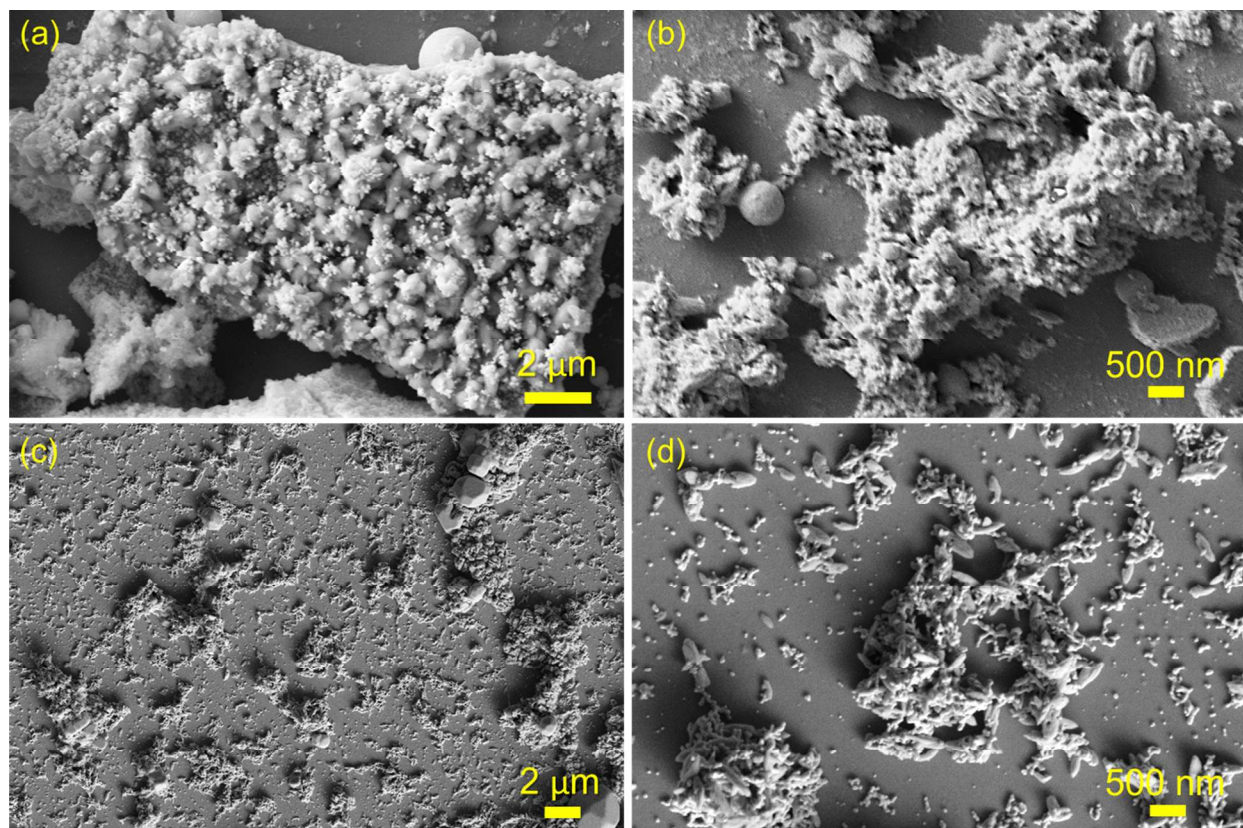


Figure S1. FESEM images of black gold formed on a galinstan droplet in (a,b) 0.1 and (c,d) 1 mM KAuCl_4 aqueous solution.

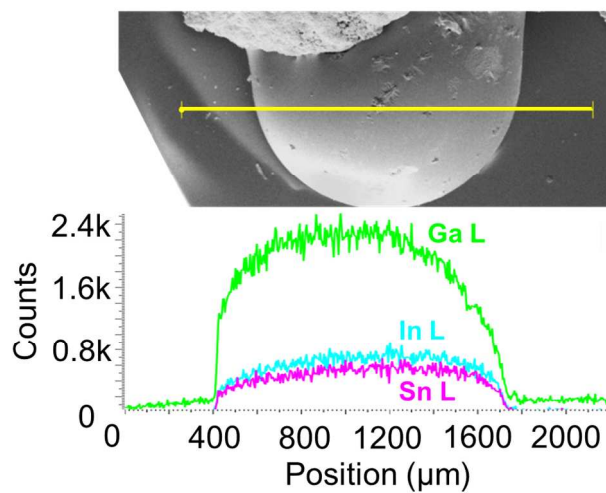


Figure S2. EDX profile across the liquid metal core shown in high resolution SEM image obtained after cutting through the black gold skin.

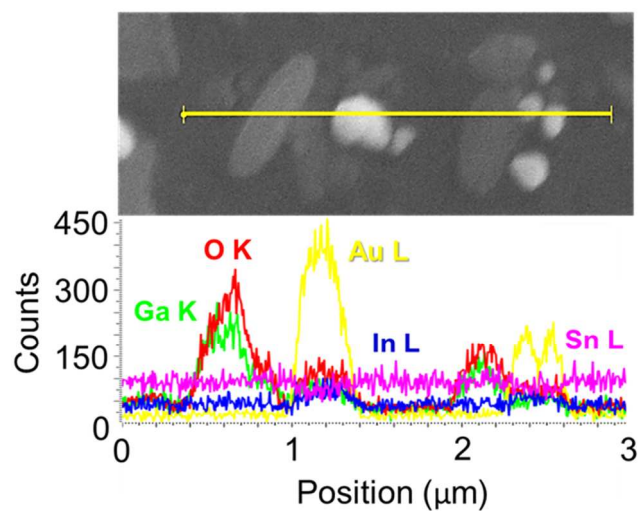


Figure S3. EDX profile across nanostructures shown in high resolution SEM image obtained in 1 mM KAuBr_4 aqueous solution via sonication.

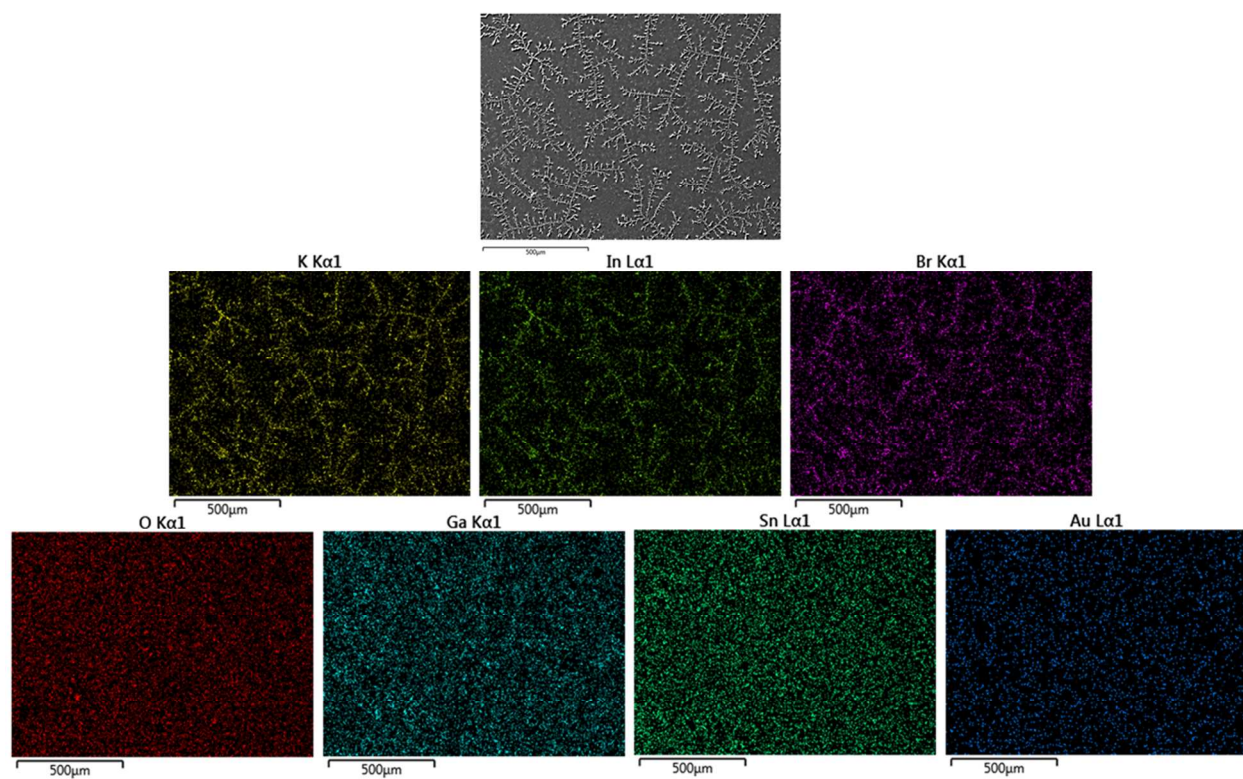


Figure S4. FESEM image and EDX mapping of KInBr_3 .

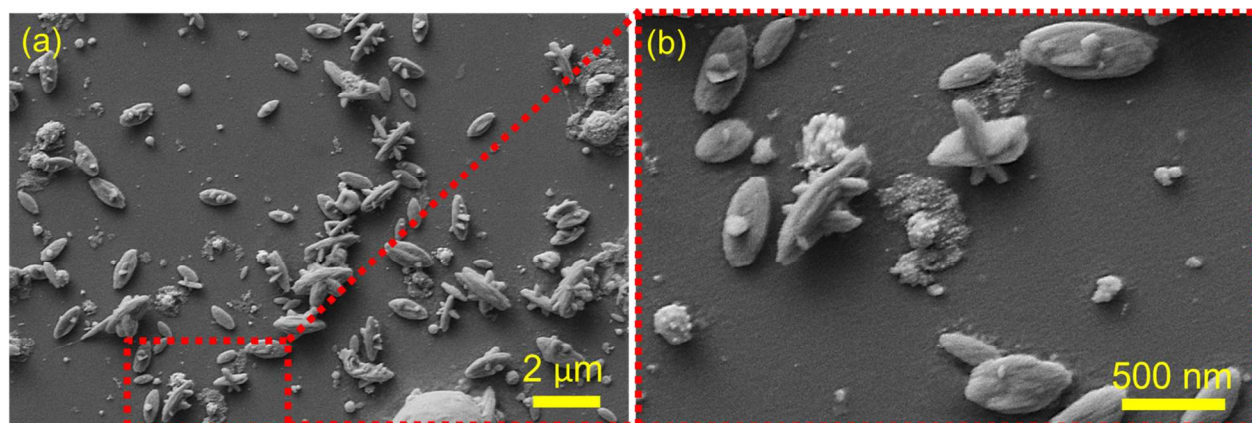


Figure S5. FESEM image of nanostructures obtained after adding 1 mM KAuBr₄ solution to galinstan already sonicated in DI water for 30 min in (a) low and (b) high magnification.

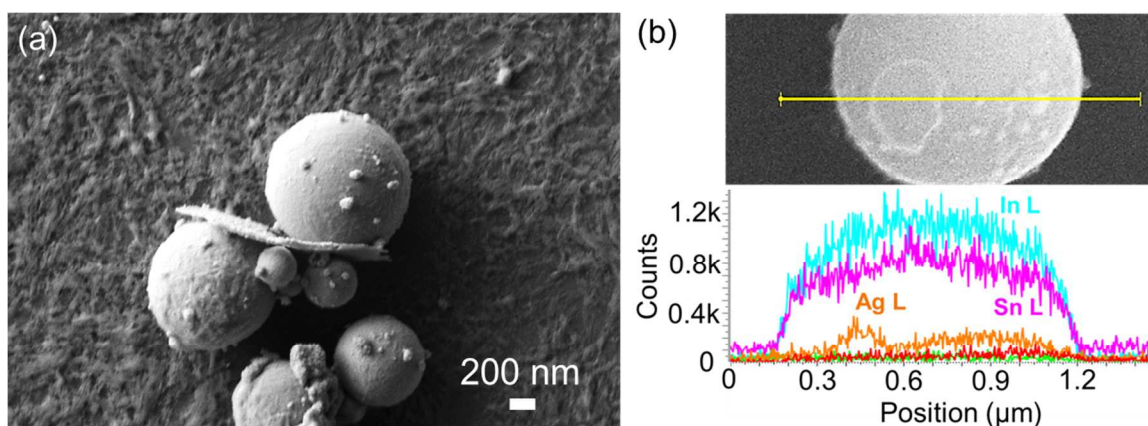


Figure S6. (a) FESEM image and (b) EDX profile across the microstructure shown in the high resolution SEM image of Ag-GaInSn based catalyst created in 1.2×10^{-2} M NaBH₄.

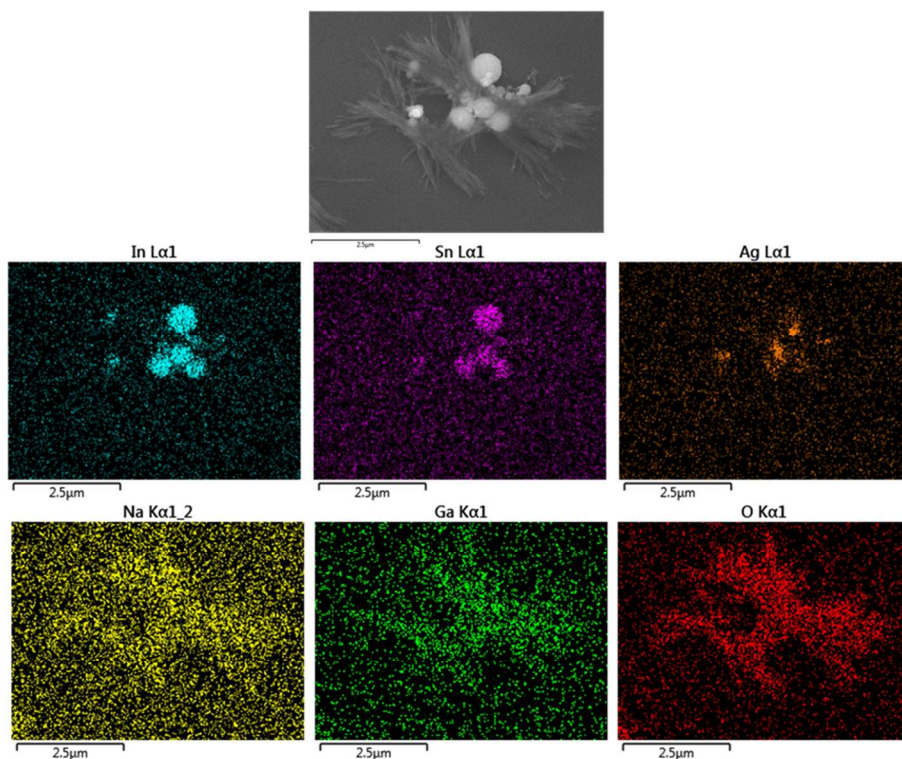


Figure S7. FESEM image and EDX mapping of sodium gallate created from the treatment of Ag-GaInSn based catalyst in 1.2×10^{-2} M NaBH_4 .

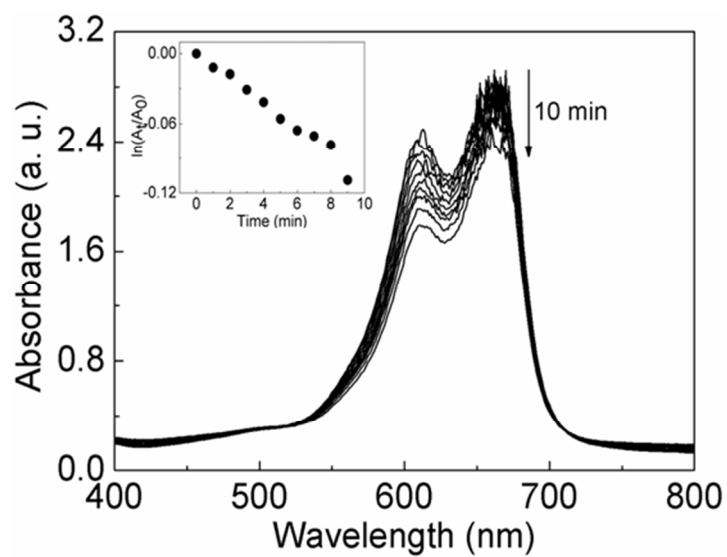


Figure S8. Time dependent UV-vis absorption spectra of the reduction of 7.2×10^{-5} M MB by an excess of NaBH_4 in the presence of galinstan based catalyst (inset: plot of $\ln(A_t/A_0)$ versus time).

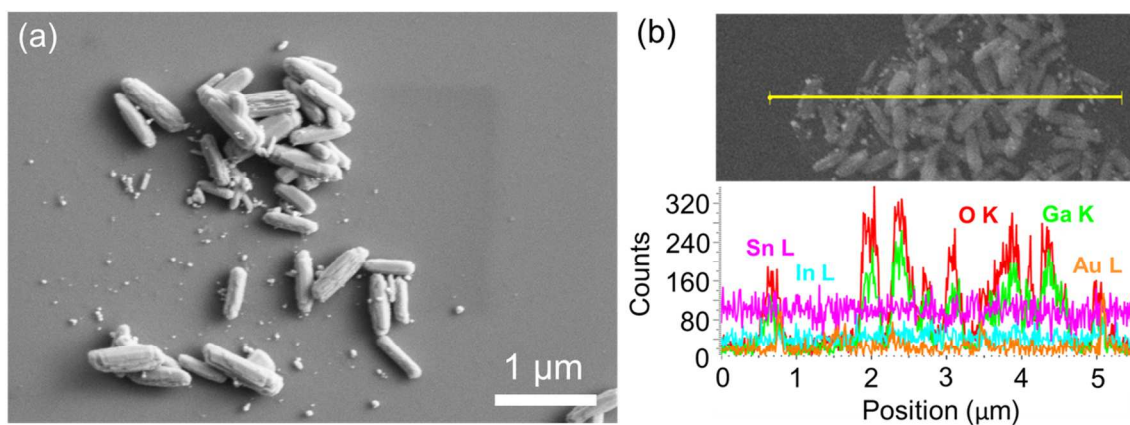


Figure S9. (a) FESEM image and (b) EDX profile across the microstructure shown in the high resolution SEM image of Au-GaInSn based catalyst created in 1.2×10^{-2} M NaBH_4 .