

Electronic Supplementary Information

for the paper

Ternary and quaternary nanocrystalline Cu-based sulfides as perspective antibacterial materials mechanochemically synthesized in a scalable fashion

Matej Baláž¹, Ľudmila Tkáčiková², Martin Stahorský¹, Mariano Casas Luna³, Erika Dutková¹, Ladislav Čelko³, Mária Kováčová¹, Marcela Achimovičová¹, Peter Baláž¹

¹Institute of Geotechnics, Slovak Academy of Sciences, Košice, Slovakia

²Department of Microbiology and Immunology, University of Veterinary Medicine and Pharmacy, Košice, Slovakia

³Central European Institute of Technology, Brno University of Technology, Brno, Czech Republic

Table S1: Main phases present in the mechanochemically synthesized ternary and quaternary Cu-based sulfides, references to the crystallographic information and to the corresponding publications. The principal phase is marked in bold.

Sample	Principal phase / Possible secondary phases	Crystallographic identification card	Reference
KOCH 1	CuFeS₂	ICSD: 28894	chalcopyrite not available
	CuS	ICOD: 11281	
	FeS ₂	ICSD: 56533	
KOCH 2	Cu₆Fe₂SnS₈	ICSD: 40047	1
	Cu ₅ FeS ₄	ICSD: 1963	
	Cu ₄ SnS ₄	ICSD: 000833	
KOCH 3	Cu₆FeSn₂S₈	ICOD: 35-0683	chatkalite not available
	Cu ₂ FeSnS ₄	ICSD: 26721	
KOCH 4	Cu₈Fe₃Sn₂S₁₂	ICOD: 351352	stannoidite not available
	SnS	ICSD: 651008	
KOCH 5	Cu₂FeSn₃S₈	ICSD: 008215	2
	Cu ₆ Sn ₅	ICSD: 158249	
	SnS	ICSD: 651008	
KOCH 6	Cu₂ZnSnS₄	ICSD: 628893	3
	ZnS	ICSD: 107167	
KOCH 7	Cu₁₂Sb₄S₁₃	ICSD: 41753	4
	Cu ₃ SbS ₄	ICSD: 002857	
	Cu ₃ SbS ₃	ICSD: 74901	
KOCH 8	Cu₁₃VSn₃S₁₆	ICOD: 411410	5
	CuS	ICOD: 11281	
	Cu ₂ SnS ₃	ICSD: 91762	
KOCH 9	Cu₂SnS₃	ICSD: 043532	6
	SnS	ICSD: 106028	
	S ₉	ICSD: 404231	
KOCH 10	Cu₃SbS₄	ICSD: 64721	7
	S ₈	ICSD: 412326	
KOCH 11	Cu₃SbS₃	ICSD: 74901	skinnerite not available
	Cu ₃ SbS ₃	ICSD: 031113	
KOCH 12	Cu₂FeSnS₄	ICOD: 35582	stannite not available
	S	ICSD: 016470	
	Cu ₂ FeSn ₃ S ₈	ICSD: 008215	
	Cu ₂ S	ICOD: 21272	

Figure S1: Representative images from testing of antibacterial activity using the agar well diffusion method: (a) samples KOCH 1-6 against *S. aureus*, (b) samples KOCH 7-12 against *S. aureus*, (c) samples KOCH 1-6 against *E. coli*, (d) samples KOCH 7-12 against *E. coli*

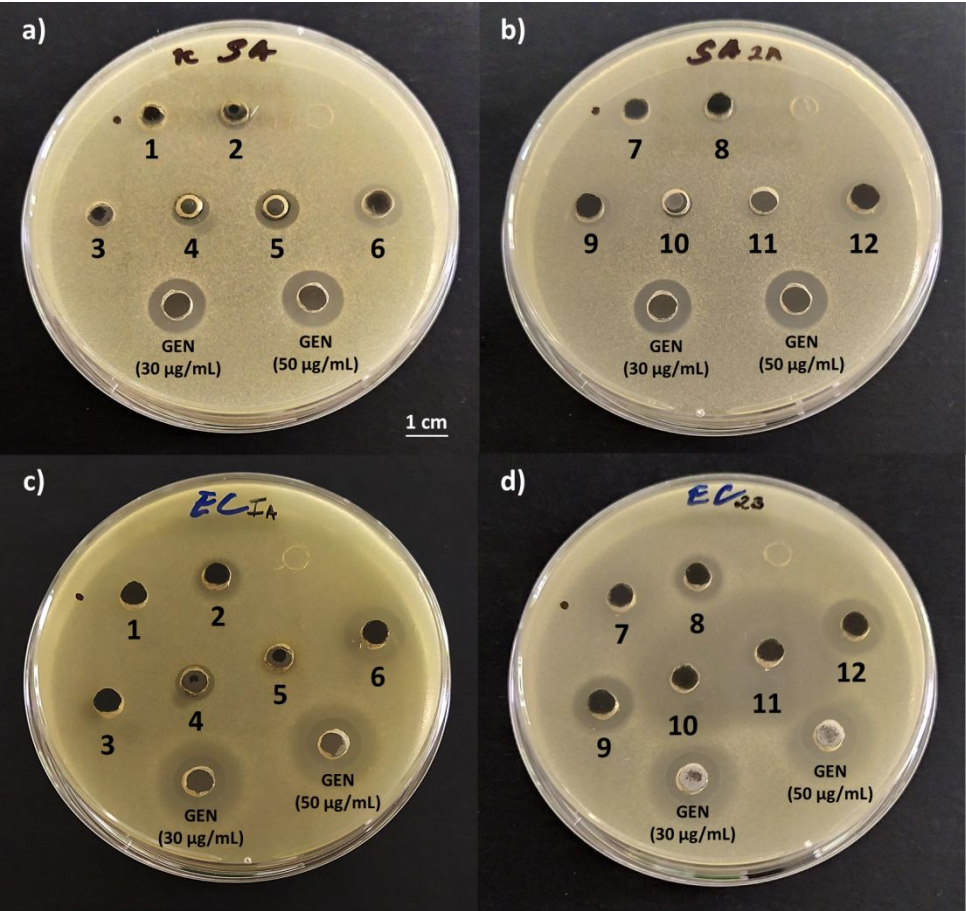


Table S2: Zeta potential values for all 12 KOCH samples under study

Sample	Main phase	Zeta potential (mV)
KOCH 1	CuFeS₂	15.3
KOCH 2	Cu₆Fe₂SnS₈	8.3
KOCH 3	Cu₆FeSn₂S₈	15.0
KOCH 4	Cu₈Fe₃Sn₂S₁₂	5.2
KOCH 5	Cu₂FeSn₃S₈	5.3
KOCH 6	Cu₂ZnSnS₄	7.9
KOCH 7	Cu₁₂Sb₄S₁₃	-12.8
KOCH 8	Cu₁₃VSn₃S₁₆	-3.3
KOCH 9	Cu₂SnS₃	7.6
KOCH 10	Cu₃SbS₄	-18.7
KOCH 11	Cu₃SbS₃	-32.9
KOCH 12	Cu₂FeSnS₄	4.3