

Facile synthesis and optical properties of pure and Ni²⁺, Co²⁺, Bi³⁺, Sb³⁺ substituted
Cu₃SnS₄.

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Essential Supporting Information (ESI†)

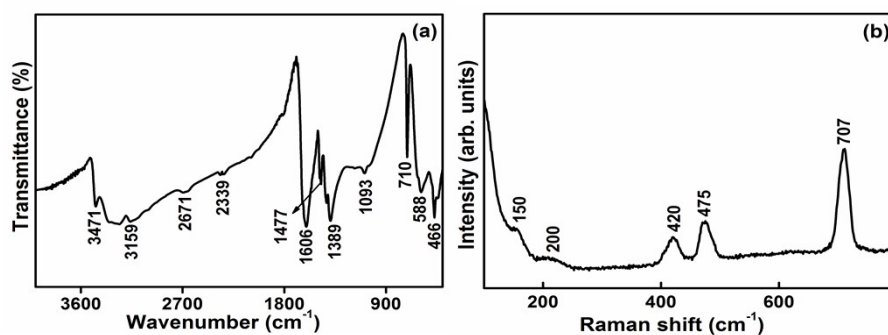


Fig. S1 (a) FT-IR and (b) Raman spectrum of [Cu(tu)₃]Cl.

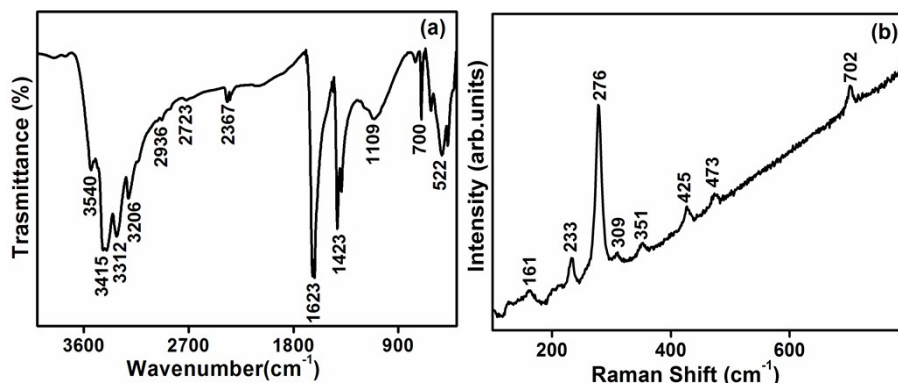


Fig. S2 (a) FT-IR and (b) Raman spectrum of [Sn(tu)Cl₂].

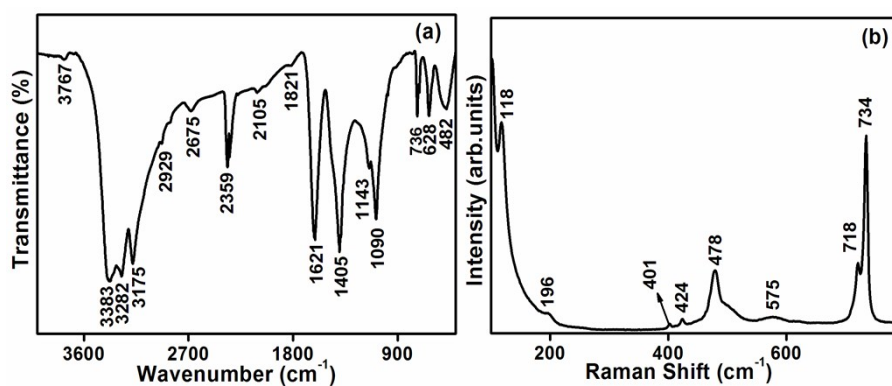


Fig. S3 (a) FT-IR and (b) Raman spectrum of $[\text{Ni}(\text{tu})_4]\text{SO}_4$.

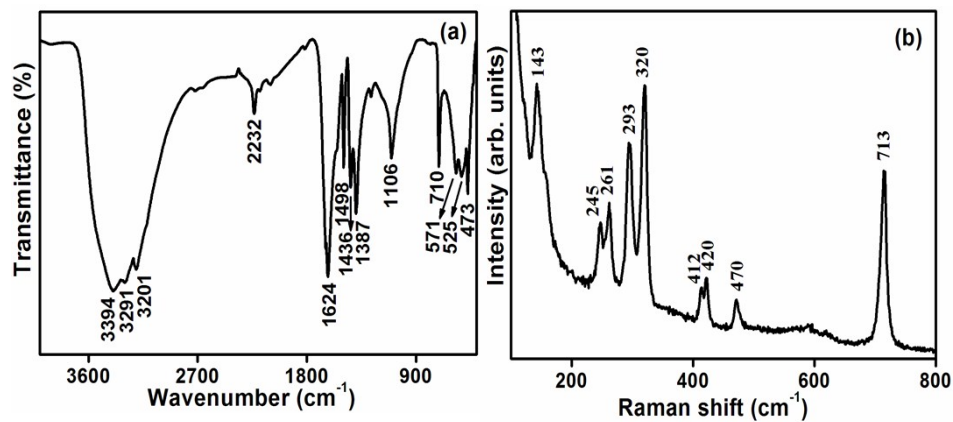


Fig. S4 (a) FT-IR and (b) Raman spectrum of $[\text{Co}(\text{tu})_2]\text{Cl}_2$.

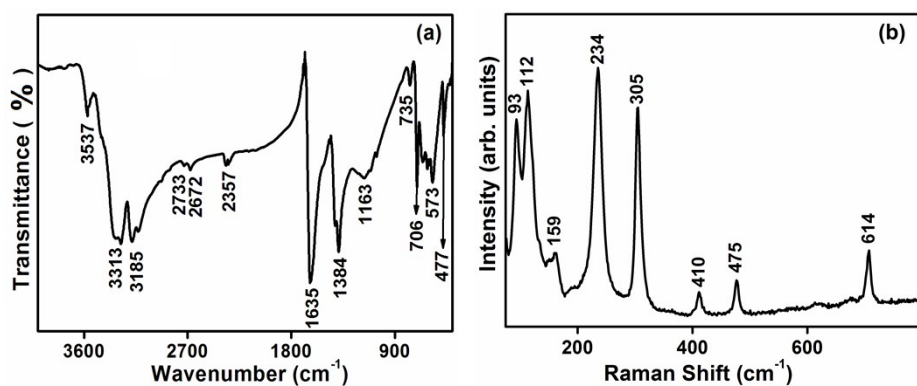


Fig. S5 (a) FT-IR and (b) Raman spectrum of $[\text{Sb}(\text{tu})_2]\text{Cl}_3$.

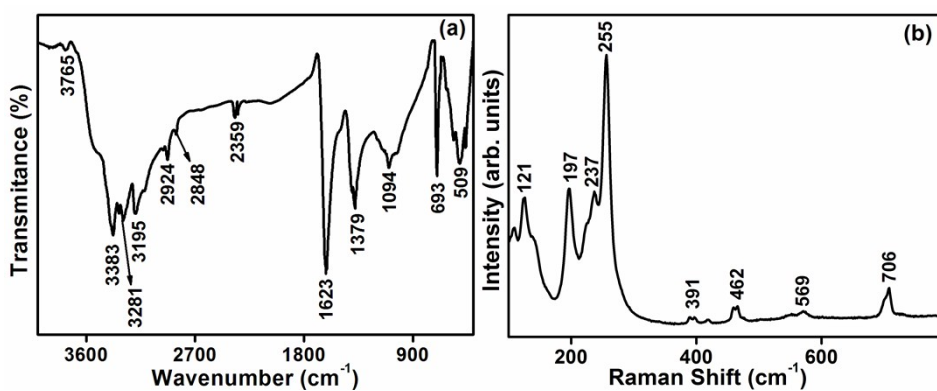


Fig. S6 (a) FT-IR and (b) Raman spectrum of $[\text{Bi}_3(\text{tu})_3]\text{Cl}_3$.

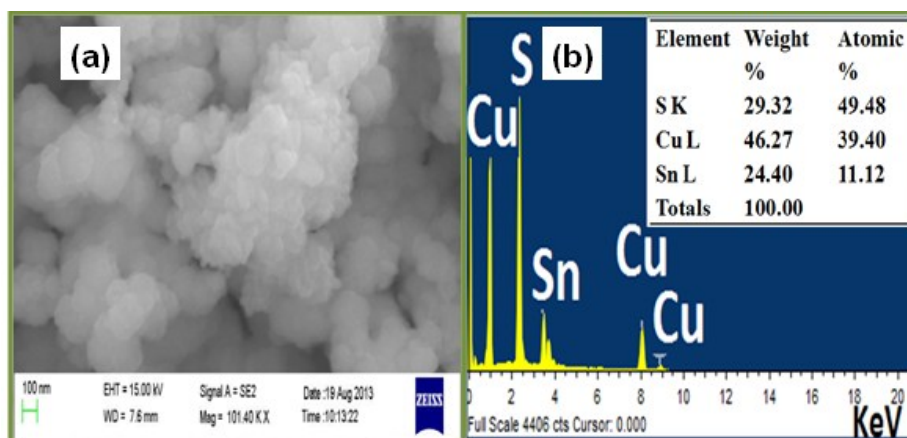


Fig. S7 (a) SEM image and (b) EDX spectrum of Cu_3SnS_4 .

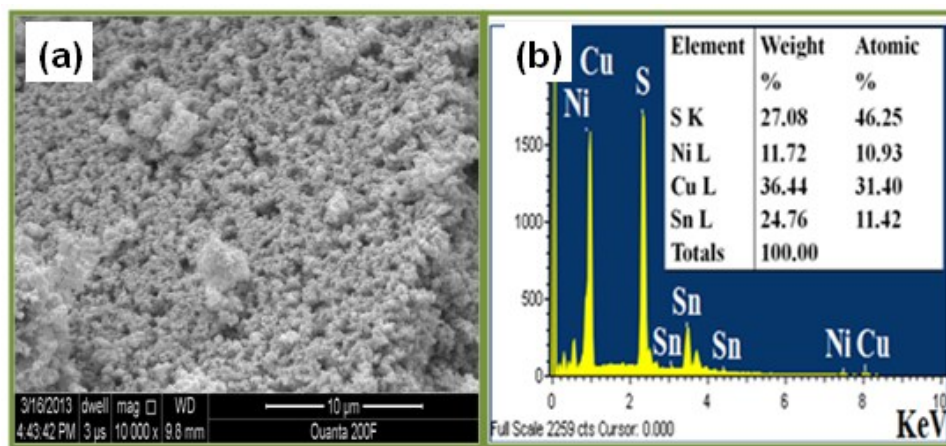


Fig. S8 (a) SEM image and (b) EDX spectrum of product from the attempts to substitute nickel in Cu_3SnS_4 .

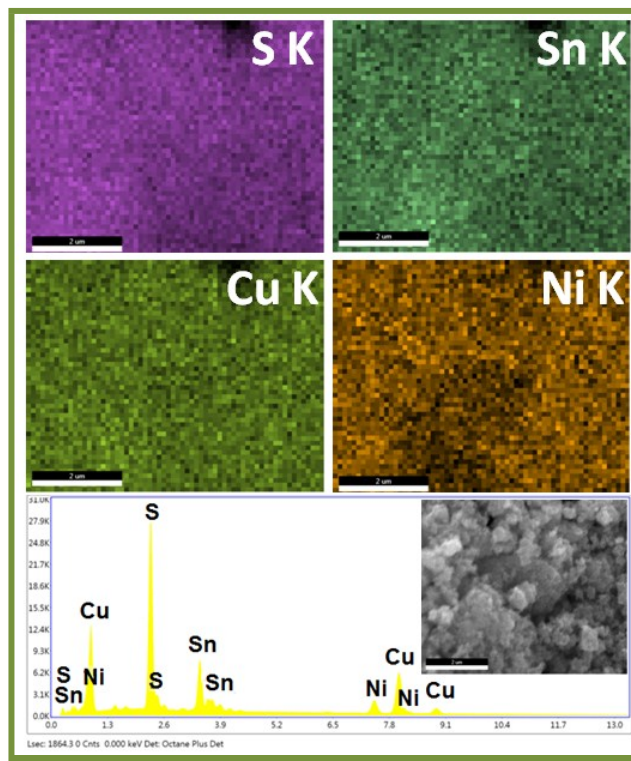


Fig. S9 EDX spectrum and elemental mapping results of $\text{Cu}_2\text{NiSnS}_4$.

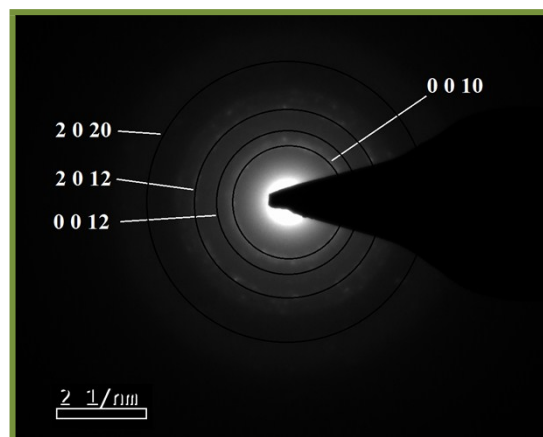


Fig. S10 SAED pattern of $\text{Cu}_2\text{NiSnS}_4$.

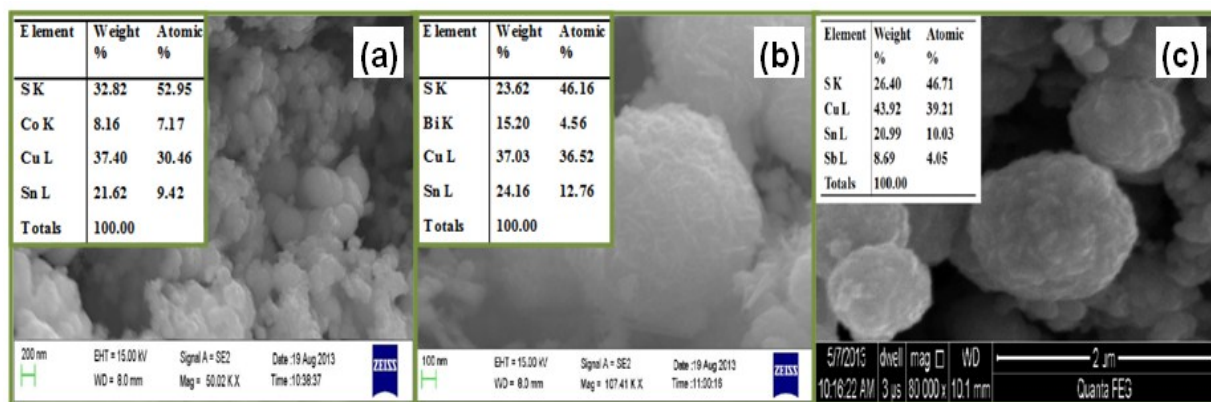


Fig. S11 SEM images with EDX analysis of (a) cobalt (b) bismuth and (c) antimony substituted Cu_3SnS_4 samples.