

Supplementary Information

Effect of Nanocolloids as an Ablation Medium on Structure and Morphology of Laser-generated Bimetallic Cu-Ni Nanoparticles

Monolina Chowdhury¹, Bibek Kumar Singh², Sudarshan Vadrnala³,
Priyanka Dewangan⁴, Prem Pal⁴, Ajay Tripathi², Rajesh Rawat^{1*}

¹Laser-Matter Interaction Research Laboratory, Department of Physics, School of Basic Sciences, SRM University Sikkim, Tadong, Gangtok, 737102, Sikkim, India.

²Department of Physics, School of Physical Sciences, Sikkim University, 6th mile Samdur, Gangtok, 737102, Sikkim, India.

³Department of Physics, School of Advanced Sciences, VIT - AP University, Inavolu, Amaravati, 522237, Andhra Pradesh, India.

⁴MEMS & Micro/Nano Systems Laboratory, Department of Physics, Indian Institute of Technology, Sangareddy, Hyderabad 502284, Telangana, India.

*Corresponding author(s). E-mail(s): rajjuu.19@gmail.com;

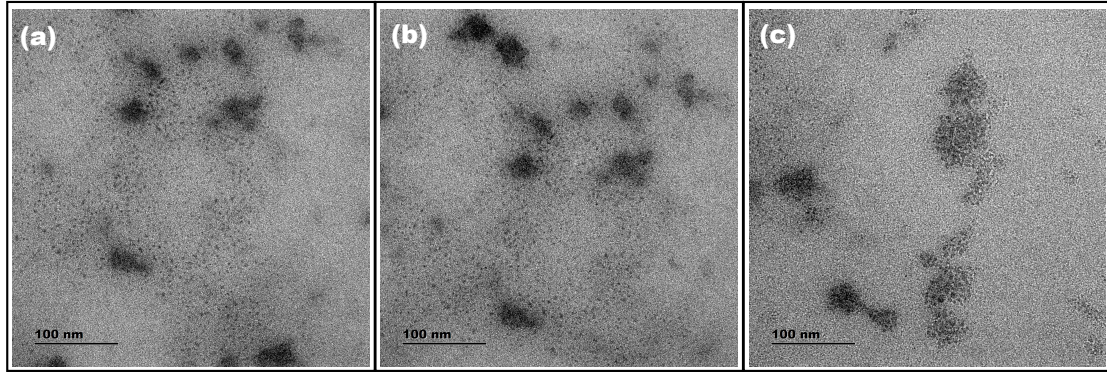


Fig. S1 (a-c) TEM image used for size distribution analysis of M1 sample.

Table S1 Physical and thermodynamic properties of the constituent elements governing the alloying of the NPs in the sample [1–3]

Elements	Atomic Radius (Å)	Surface Free Energy (J/m ²)	Melting Temperature (K)	Thermal Conductivity (W/m K)	Crystal Structure	Lattice Parameter (Å)
Cu	1.28	1.48	1358	397	FCC	3.61
Ni	1.24	2.34	1728	88	FCC	3.52

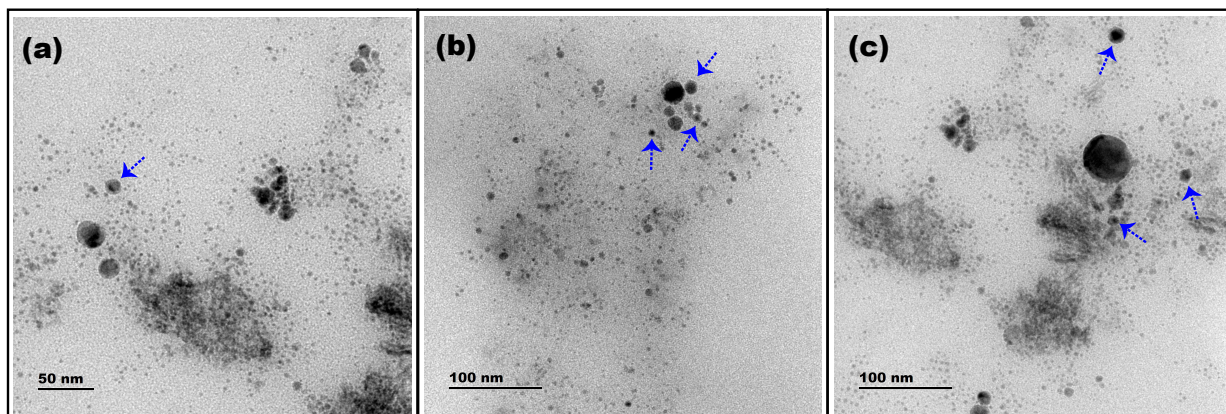


Fig. S2 (a-c) TEM image used for size distribution analysis of M2 sample. The blue dotted arrows in the figures show the formation of CS structures in M2 sample.

References

- [1] Ahmed J, Ramanujachary KV, Lofland SE, Furiato A, Gupta G, Shivaprasad S, et al. Bimetallic Cu-Ni nanoparticles of varying composition (CuNi₃, CuNi, Cu₃Ni). *Colloids and Surfaces A: Physicochemical and Engineering Aspects*. 2008;331(3):206–212.
- [2] Beaumont SK, Alayoglu S, Pushkarev VV, Liu Z, Kruse N, Somorjai GA. Exploring surface science and restructuring in reactive atmospheres of colloidally prepared bimetallic CuNi and CuCo nanoparticles on SiO₂ in situ using ambient pressure X-ray photoelectron spectroscopy. *Faraday Discussions*. 2013;162:31–44.
- [3] Rawat R, Blanchard NP, Shadangi Y, Tripathi A, Amans D. Laser Generation of AlCrCuFeNi High-Entropy Alloy Nanocolloids. *The Journal of Physical Chemistry C*. 2024;128(46):19815–19828.