Effect of aluminum trapping by Cu condensation on thermite reaction of Al/CuO composite

이규현, 김휘동, 김다흰, 심재원, 배상범, 신도중, 유지창[1],
이도창†
KAIST; [1]국방과학연구소
(dclee@kaist.edu†)

Nanothermite, mixture of nano-scale fuel and oxidizer, is attractive material for its high exothermic reaction resulted from high surface area compared to microthermite. Among the various thermite material, Al-CuO composites is commonly used. In Al-CuO system, the stoichiometric reaction is 3CuO + 2Al → 3Cu + Al2O3. While Al-CuO is fully ignited when molar ratio of CuO and Al is 3 to 2, it is observed that maximum explosion is occurred in Al-rich environment. In this research, we suggest condensed Cu on unreacted Al affect critically in Al-CuO thermite reaction. We detected Cu and AlxCuy alloy, result of diffusion between Al and condensed Cu, in XRD patterns. Additionally, TEM image showed AlxCuy alloy and Cu on the Al surface and we believe these materials block a supply of oxygen into Al core.