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# Developing Radiopure Copper Alloys for High Strength Low Background Applications

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High purity copper continues to play an important role for ultra-low-background detectors. Measurements of rare nuclear decays, e.g. neutrinoless double-beta decay, and searches for dark matter can require construction materials that have high thermal and electrical conductivity with bulk radiopurity less than one micro-Becquerel per kilogram. However, experiments currently using components constructed of radiopure electroformed copper struggle with design of structural and mechanical parts due to the physical properties of pure copper. A higher strength material which possesses many of the favorable attributes of copper yet remains radiopure is desired. A number of copper alloying candidates which may provide improved mechanical performance and adequate radiopurity were considered. Development of an electrodeposited copper-chrome alloy from additive-free electrolyte systems is discussed. The resulting material is shown to possess high strength and meets the aforementioned radiopurity goals.

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