Abstract: The safety plugs presently used on our equipment in the Nigerian industries are wholly imported. This research is aimed therefore at developing safety fuse plugs, using locally available materials that will compare favourably with the imported safety fuse plugs. Minerals from various mining sites in the country and laboratory samples were collected. Beneficiation processes were carried out on the samples using foundry equipment which included electric furnace, tongs, and crucibles. Impure and beneficiated samples were mixed at various eutectic compositions to determine the effective mix that would meet specific temperature blowouts. A comparative test was carried out on imported and the developed samples. It was observed that there was no significant difference in the performances using the $\chi^2$ test at $p = 0.05$. It was also discovered that the presence of impurities also affected the composition of the alloy as reflected by the ANOVA conducted on the different samples produced.