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Neutron Activation Analysis, A Titanium Material Study
CHARLES DRESSER, California State University, Sacramento — In order to obtain faster and more accurate measurements of radioactive contaminates within a sample of titanium we expose it to a neutron flux. This flux will activate the stable and quasi stable (those with extremely long half lives) isotopes into resultant daughter cells that are unstable which will result in shorter half lives on the order of minutes to days. We measured the resulting decays in the Germanium Crystal Detector and obtained a complex gamma spectrum. A mathematical model was used to recreate the production of the measured isotopes in the neutron flux and the resultant decays. Using this model we calculated the mass percent of the contaminate isotopes inside our titanium sample. Our mathematical model accounted for two types of neutron activation, fast or thermal activation, since this would determine which contaminate was the source of our signals. By looking at the percent abundances, neutron absorption cross-sections and the resulting mass percents of each contaminate we are able to determine the exact source of our measured signals. Additionally we implemented a unique ratio method to cross check the mathematical model. Our results have verified that for fast neutron activation and thermal neutron activation the method is accurate.

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