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Abstract:

In order to better understand the formation of our solar system, we must be able to accurately date significant events. Radiometric dating is a very important tool as it allows us to accurately date such events. The now extinct radioisotope system ( $^{107}\text{Pd}$ - $^{107}\text{Ag}$ ) is very helpful as it may be used to date the time the solid part of the core crystallized out of the liquid core in planetesimals that had existed in our early solar system. If the ( $^{107}\text{Pd}$ - $^{107}\text{Ag}$ ) radioisotope system is used to date the cooling process of these planetesimals, we must first characterize the diffusion of these radioisotopes through the medium in which they are naturally found to reside (FeS). To do so we have conducted several thin film experiments over a large temperature range so that we may find what is known as the closure temperature of the ( $^{107}\text{Pd}$ - $^{107}\text{Ag}$ ) radioisotope system. At this temperature we are certain these radioisotopes may no longer effectively diffuse through the FeS. We are able to use Rutherford backscattering spectroscopy (RBS) to analyze the diffusion profiles of Pd and Ag through the thin FeS wafers.