



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Samuel J. Coleman	Project Number S0705
Project Title Rethinking the Origins of Aplite Dikes within the Half Dome Granodiorite Using Initial Strontium and Lead Ratios	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Problem: What is the origin of the aplitic dikes present in the Half Dome Granodiorite?</p> <p>Hypothesis: I believe that the aplitic dikes result from the squeezing of silicic melt from the surrounding plutonic rocks into cracks that formed as the rock cooled and shrank.</p> <p>Methods/Materials Materials: 5 ~300 mg aplite samples; 14 - 15 mL Teflon beakers; 16 waste beakers; well-ventilated hotplate; 100 mL MilliQ water; 50 mL 13N nitric acid; 100 mL 29N hydrofluoric acid; ~150 mL 6N hydrochloric acid; 150 mL 1.1 N hydrobromic acid; 50 mL 2N hydrochloric acid; 100 mL 3.5N nitric acid; 10 mL dilute phosphoric acid; 1 mL silica gel (suspension of silicon in water); 1 mL tantalum chloride; Strontium columns; Lead columns; Eichrom anion resin AG1x8 (for lead columns); Strontium resin; VG Sector 54 Mass spectrometer</p> <p>Methods: Five aplite samples measured; samples dissolved in acid and dried down (three times); each sample redissolved and split in two parts (one for Strontium, one for Lead); each sample centrifuged; Strontium samples run through Strontium column sequence; Lead samples run through Lead column sequence; all samples analyzed in a mass spectrometer</p> <p>Results My results consist of data obtained from the mass spectrometer, primarily current ratios of radioisotopes found in the rock samples analyzed. Unfortunately, the data would not make much sense put in this format, so the actual numbers will be omitted.</p> <p>Conclusions/Discussion Discussion: The data obtained was used to determine the initial ratios of rubidium and lead in the sample rocks. This was calculated mathematically using the decay equation. This information was used in conjunction with the rubidium decay constant to determine the age of the aplites. The ages of all of the sampled aplites were found to be approximately 81 million years. Using a new decay constant that was only recently calculated and has not yet been fully confirmed, the age was found to be approximately 85 million years.</p> <p>Conclusion: The data obtained proves my hypothesis wrong. There is clearly no correlation between the Half Dome Granodiorite and its aplites. There is a great disparity in ages, which is a clear indicator of the</p>	
Summary Statement The purpose of my project is to determine the veracity of the commonly held theory of aplite emplacement, a theory that to my knowledge has remained largely untested.	
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