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| Report for International Internship |  |
| Student Name: | Rajorshi Chattopadhyay |
| Program Name: | Visiting Undergraduate Research Program, Caltech |
| University: | California Institute of Technology, Pasadena, CA |
| Department: | Division of Geological and Planetary Sciences |
| Project Topic: | Helium Diffusion in Olivine Fluid Inclusions |
| IITKGP Dept./School/Center and Degree Program: | Department of Geology and Geophysics/ 5 year Integrated M.Sc program in Applied Geology |
| Duration of Internship: | 17th May – 19th July 2019 |
| Supervisor Name: | Prof. Dr. Paul Asimow |

**PROJECT DETAILS, OUTCOMES AND SUMMARY (3-4 BULLET POINTS OF WHAT YOU LEARNED AND HOW IT IS GOING TO APPLY TO REAL LIFE):**

* Diffusion is thought to play an important role in ingassing helium into the fluid inclusions of Baffin Island olivines (a silicate mineral). These olivines therefore show an extremely high helium isotopic ratio which is not seen in minerals formed under identical geological conditions in any other place around the world. The aim of this project was to understand the role of fluid inclusions in the helium diffusion process.
* I learnt using the TZM Cold Seal Apparatus which is used for such high temperature and pressure diffusion experiments (we would sometimes go to as high as 12000C at around 1 kbar of gas pressure)
* I also learnt handling the Helix SFT Noble Gas Mass Spectrometer. This was used to crush the olivines after diffusion experiments. Helium that came out of the fluid inclusions was analysed.
* The project is ongoing. We plan to do numerical simulations for the olivine helium system if the experimental data does not give us good insights into the role of fluid inclusions in the diffusion process.
* If we succeed in determining the role of fluid inclusions in diffusion process we can understand beautiful things out of it. We will have good insights into the temporal evolution of our atmosphere which is essentially a product of outgassed mantle gases. We will be able to predict the composition of the atmosphere in future.
* We will know more about the composition and P,T conditions of deep lower mantle that is

still unknown.

**OTHER ACTIVITES:**

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* I went to several beaches and hiking trails near Pasadena and LA.
* We visited the famous bakery in downtown LA that did not close since 1924.
* I tried cuisines from different countries around the world.
* Made lot of friend!!
* Played baseball with American friends.