Experimental Summary:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Date | Temp (K) | Ions | I (uA) | Duration | Exposure | Max Temp | Notes |
| CO2 ice | 11/17/2015 | 10 | D2+ | 2.0 | 1 hr. 45 min | 8 x 1016 |  |  |
| Olivine | 12/14/2015 | 10 | D2+ | 1.0 | 10 hr | 2.3 x 1017 |  |  |
| Olivine | 12/19/2015 | 10 | BLANK | N/A | N/A | N/A |  |  |
| Olivine | 12/31/2015 | 10 | D2+ | 2.0 | 10 hr | 4.6 x 1017 |  |  |
| Olivine | 1/13/2016 | 240 | D2+ | 1.0 | 10 hr | 2.3 x 1017 |  |  |
| Olivine | 1/21/2016 | 330 | D2+ | 2.0 | 5 hr | 2.3 x 1017 |  |  |
| Olivine | 1/26/2016 | 290 | D2+ | 2.0 | 28 hr | 2.6 x 1018 |  |  |
| Olivine | 2/16/2016 | 10 | e- | 0.1 | 10 hr |  |  |  |
| Perchlorate | 2/22/2016 | 10 | e- | 0.1 | 1 hr |  |  |  |
|  |  |  | D2+/e- | 2.0 each | 10 hr |  |  |  |
|  |  |  | D2+ | 2.0 | 5.5 hr |  |  |  |
| **Perchlorate** | **3/2/2016** | **50** | **BLANK** | **N/A** | **10 hr** | **N/A** |  |  |
| **Perchlorate** | **3/3/2016** | **50** | **D2+ and e-** | **2.0 each** | **10 hr** |  |  |  |
| **Perchlorate** | **3/11/2016** | **50** | **D2+** | **2.0** | **10 hr** |  |  |  |
| Perchlorate | 3/17/2016 | 50 | e- | 2.0 | 10 hr |  |  |  |
| **Perchlorate** | **3/23/2016** | **50** | **e-** | **2.0** | **10 hr** |  |  |  |
| **Perchlorate** | **3/28/2016** | **50** | **e- 🡪** **D2+** | **2.0 each** | **10 hr each** |  |  |  |
| **Perchlorate** | **4/4/2016** | **50** | **D2+ 🡪 e-** | **2.0 each** | **10 hr each** |  |  |  |
| **Perchlorate** | **4/19/2016** | **50** | **D2+ and e-** | **2.0 each** | **100 hr** |  |  |  |
| **Olivine** | **5/2/2016** | **50** | **D2+ and e-** | **2.0 each** | **100 hr** |  |  |  |
| Olivine | 5/12/2016 | 250 | D2+ and e- | 2.0 each | 30 hr |  |  |  |
| Olivine | 6/6/2016 | 50 | BLANK | N/A | 10 hr |  |  |  |
| Olivine | 6/7/2016 | 50 | D2+ | 1.0 | 10 hr |  |  |  |
| Olivine | 6/15/2016 | 50 | D2+ | 1.0 | 10 hr |  |  |  |
| **Olivine** | **8/6/2016** | **50** | **D2+** | **2.0** | **10 hr** |  |  |  |
| **Olivine** | **8/12/2016** | **80** | **D2+** | **2.0** | **10 hr** |  |  |  |
| **Olivine** | **8/20/2016** | **50** | **BLANK** | **N/A** | **10 hr** |  |  |  |
| **Olivine** | **8/23/2016** | **10** | **BLANK** | **N/A** | **10 hr** |  |  |  |
| Olivine | 8/24/2016 | 10 | D2+ | 2.0 | 10 hr |  |  |  |
| Olivine | 8/29/2016 | 10 | D2+ | 2.0 | 10 hr |  |  |  |
| Olivine | 9/5/2016 | 10 | D2+ | 2.0 | 10 hr |  |  |  |
| Olivine | 9/11/2016 | 10 | BLANK | N/A | 10 hr |  |  |  |
| Olivine | 9/12/2016 | 10 | D2+ | 2.0 | 10 hr |  |  |  |
| Olivine | 9/17/2016 | 50 | D2+ | 2.0 | 10 hr |  |  |  |
| Olivine | 5/27/2017 | 10 | BLANK | N/A | 11 hr |  | 300 |  |
| Olivine | 5/29/2017 | 10 | D2+ | 2.0 | 3 hr |  | N/A |  |
| Olivine | 6/2/2017 | 10 | D2+ | 2.0 | 13 hr |  | 300 |  |
| Olivine | 6/13/2017 | 10 | D2+ | 2.0 | 13 hr |  | 300 |  |
| Olivine | 6/19/2017 | 10 | BLANK | N/A | 13 hr |  | 300 |  |
| Olivine | 6/20/2017 | 10 |  |  |  |  |  |  |
| Olivine | 6/21/2017 | 10 | BLANK | N/A | 13 hr |  | 300 |  |
| Olivine | 6/22/2017 | 10 | D2+ | 2.0 | 13 hr |  | 300 |  |
| Olivine | 6/28/2017 | 80 | BLANK | N/A | 13 hr |  | 300 |  |
| Olivine | 6/29/2017 | 80 | D2+ | 2.0 | 13 hr |  | 300 |  |
| **Olivine** | **10/9/2017** | **80** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| Olivine | 10/13/2017 | 40 | BLANK | N/A | 13 hr |  | 300 |  |
| **Olivine** | **10/15/2017** | **40** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| **Olivine** | **10/20/2017** | **120** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| **Olivine** | **10/26/2017** | **200** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| **Olivine** | **10/30/2017** | **250** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| **Olivine** | **11/15/2017** | **10** | **BLANK** | **N/A** | **13 hr** |  | **300** |  |
| **Olivine** | **11/16/2017** | **10** | **D2+** | **2.0** | **13 hr** |  | **300** |  |
| Olivine | 11/21/2017 | 10 | D2+ / CO2 | 2.0/4,6,7,8,9% | 13 hr / 30 min |  | 300 |  |
| Olivine | 11/26/2017 | 10 | BLANK / CO2 | NA/4,6,7,8,9% | 13 hr / 30 min |  | 300 |  |
| Olivine |  |  |  |  |  |  |  |  |
| Olivine |  |  |  |  |  |  |  |  |

Notes:

|  |  |
| --- | --- |
| **5/2/2016** | Successful experiment. **Results show a great deal of Dand D2 during TPD**, but no D2O or D2O2 |
| 5/12/2016 | During irradiation, strange signals began to appear with masses 2, 16, 28, 32, and 44. Pressure in the main chamber increased dramatically during these events. Experiment was terminated after 30 hrs of irradiation. |
| 6/6/2016 | Blank experiment at 50 K. The target could only reach 230 K during TPD |
| 6/7/2016 | Irregular signal from mass 18 and 28. Mass 32 seems to be related to mass 28 based on behavior during irradiation. **TPD shows a mass 2 signal which could suggest deuterium storage**, but mass 44 shows oscillation that has never been seen before. Target could only reach 230 K during TPD |
| 6/15/2016 | Potentially useful experiment, however mass 18 is very irregular during irradiation (signal should be relatively constant but instead there are spikes). **Mass 2 signal during TPD, but no mass 4** |
| **8/6/2016** | Successful experiment. **TPD shows large, clear peaks for mass 2 and 4** |
| **8/12/2016** | High background noise throughout experiment. Sharp mass 18 peak during irradiation--??. **Mass 2 signal during TPD, but no mass 4** |
| **8/20/2016** | Convincing blank experiment shows no mass 2 or 4 signals during TPD. Compare with experiment on 6/6/2016 |
| **8/23/2016** | High background. Large peak for mass 2 and 4 at the onset of TPD, which has been observed previously at this temperature. Slightly delayed peak of mass 28 and 32, which has not been observed before. The peaks of interest for mass 2 at 30-60 K and mass 4 around 150 K were not observed. |
| 8/24/2016 | Data collection stopped in the middle of the night during TPD around 147 K. This is right before the mass 4 peak would have appeared. **There is a mass 2 peak at lower temperatures as expected.** |
| 8/29/2016 | Redo of previous experiment. All experimental conditions were repeated, including sample thickness, yet **there is no mass 4 peak during TPD.** Very noisy background throughout the experiment. |
| 9/5/2016 | Repeated the experiment again. Background was very low compared to last several experiments. About 8 hours into irradiation, a massive peak of masses 2 and 4 was seen. During TPD, the **mass 2 peak was irregularly shaped and not much higher than the background. No mass 4 peak.** |