**Introduction**

- Martian phyllosilicates are Noachian in age and hold clues to Mars’ early history [1, 2]
- Nontronite, montmorillonite, saponite, kaolinite, chlorite, serpentine, and prehnite are found on Mars [2-5]
- Some deposits are located in impact craters or near lava flows [2, 6]
- Spectra of nontronite and montmorillonite clearly evolve with temperature [6]

**Motivation**

- Understanding a deposit’s thermal history:
  - Constrains depositional conditions and alteration processes
  - Provides insight into early surface conditions on Mars

**Methods**

- Samples heated for 24 hours between 300 and 1100°C in 100°C increments
- Samples put on a 150°C hot plate under N₂ flow for two hours before NIR spectral measurements
- NIR and MIR spectra collected using a Nicolet 6700 FTIR

**Near-Infrared Data**

**Mid-Infrared Data**

**Discussion**

- NIR spectra a proxy thermometer for maximum alteration temperature until spectra become featureless
- High temperature secondary phases identified by MIR spectra [6]
- Metal-OH bands may shift location due to different thermal resistances of Fe-OH, Mg-OH, and Al-OH bonds [4, 6] (Fig. 4)

**Mars Comparisons**

- Saponite in a Mawrth Vallis crater [2] is likely thermally altered (Fig. 5)
- Saponite in the crater thus predates impact

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**References**