

Supplementary Materials for

Sodium chloride on the surface of Europa

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Fig. S1. Representative HST/STIS spectra of the three chemical terrains on the surface of Europa.

Fig. S2. Laboratory spectra of select irradiated salts.

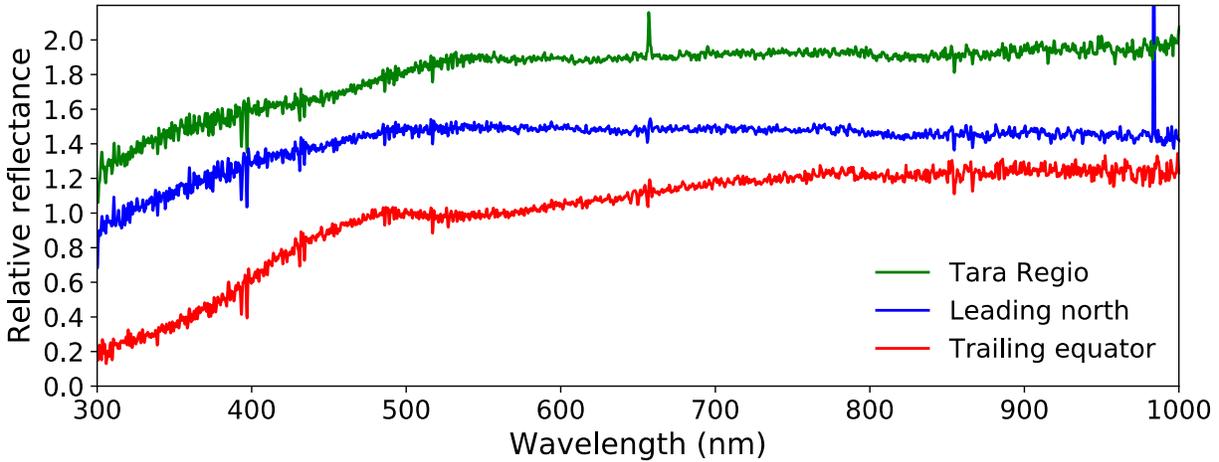


Fig. S1. Representative HST/STIS spectra of the three chemical terrains on the surface of Europa. In green, is a single spectrum from the leading hemisphere chaos region Tara Regio, which contains a clear 450 nm absorption consistent with irradiated NaCl. In contrast, representative spectra from the spectrally icy northern mid-latitudes of the leading hemisphere (31° N, 43° W) (blue) and from near the apex of the trailing hemisphere (2° N, 273° W) (red) do not display this feature. Beyond ~ 600 nm, all three spectra are quite similar and appear to lack any strong absorptions, though some artifacts of the defringing process remain, particularly beyond ~ 800 nm. The spectra are scaled to unity at 550 nm. The blue and green spectra are offset vertically by 0.5 and 0.9 units, respectively. Significant slit losses and the broad point spread function of STIS made determination of the continuum shape difficult for the G750L data ($\sim 550 - 1000$ nm). We correct for this by scaling the spectra at these wavelengths by the functional relationship between the average of our HST G750L spectra of the leading hemisphere and the known continuum of the leading hemisphere over the same wavelength range (33, 43). The G430L portions of the spectra ($\sim 300 - 550$ nm) have been smoothed to match the signal-to-noise of the longer wavelengths.

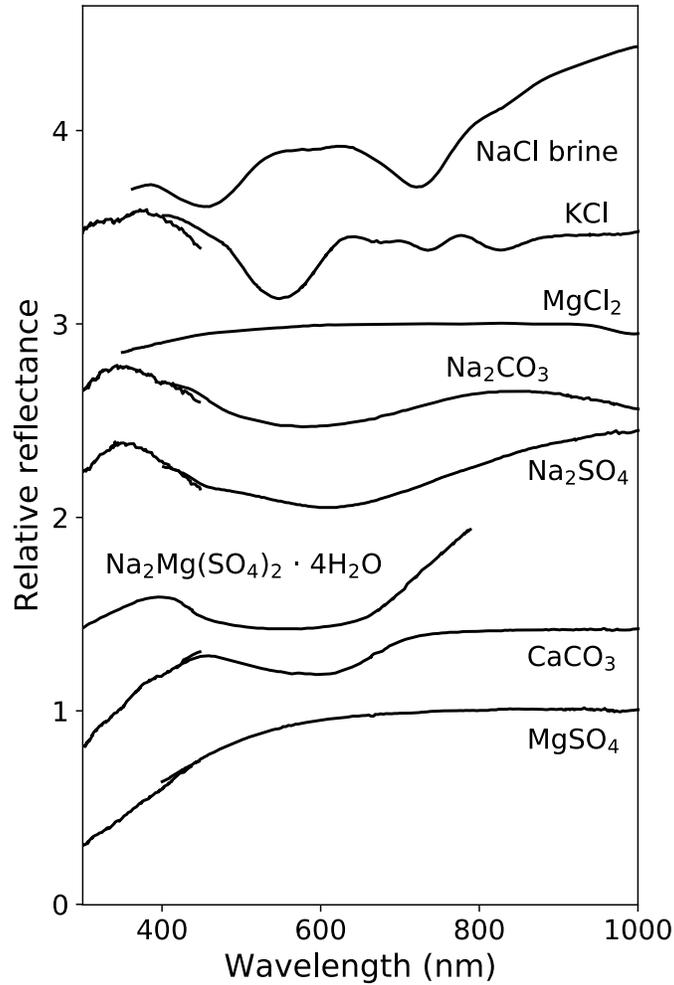


Fig. S2. Laboratory spectra of select irradiated salts. Here, we reproduce a selection of irradiated salt spectra that can be examined for the presence of a 450 nm absorption. With the exception of the NaCl brine taken from (23), all of the spectra shown were taken at room temperature. The bloedite spectrum ($\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$) is from (29), the MgCl_2 spectrum is from (35), and the remaining salt spectra are from (34). Of all of the spectra, only NaCl can explain the observed 450 nm absorption on Europa, and most have strong absorptions elsewhere that we do not observe in our HST data. All spectra are normalized to unity at 750 nm, and each spectrum is offset vertically by 0.4 units from the one below it.