



Surface charging of thick porous water ice layers in ion sputtering experiments: implications for the surfaces of icy moons

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We use a laboratory facility to study the sputtering properties of centimeter-thick porous water ice subjected to the bombardment of ions and electrons to better constrain exosphere models of the icy moons of Jupiter. Our ice samples are as similar as possible to the expected surface properties of Europa. Surface charging of these samples may distort any experimental results for ion sputtering. In this preparatory study we therefore focus on the electric properties of ice at different temperatures, in particular the time scales for charging and discharging when subjected to a beam of ions. Regarding the ion sputtering yield, our experiments yield similar results as previous experiments where thin dense ice layers were sputtered off a micro-balance. However, our experiments also allow us to derive an electric conductivity of porous ice. The results imply that electron precipitation and sputtering play a non-negligible role for certain plasma conditions at the icy moons of Jupiter.