Electronic Supplementary Information

# HCl adsorption on ice at low temperature: a combined X-ray absorption, photoemission and infrared study.

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| HCl exposure at 90 K (L) | HCl coverage at 90 K (ML) | HCl exposure at 50 K (L) | HCl coverage at 50 K (ML) |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0.1 | 0.11 | 0.1 | 0.06 |
| 0.2 | 0.17 | 0.3 | 0.16 |
| 0.3 | 0.22 | 0.5 | 0.25 |
| 0.5 | 0.29 | 1 | 0.40 |
| 0.7 | 0.34 | 2 | 0.7 |
| 1.0 | 0.40 | 7 | 1.2 |
| 3.0 | 0.66 | 13 | 1.7 |
| 8.0 | 0.81 | - | - |
| 16.0 | 0.92 | - | - |
| 40.0 | 0.96 | - | - |
| 80.0 | 1.0 | - | - |

**Table S1**. Relation between the HCl exposures (in Langmuir, L) and the HCl coverages (in monolayers, ML) at 90 and 50 K as deduced from the NEXAFS intensities at 207 eV.
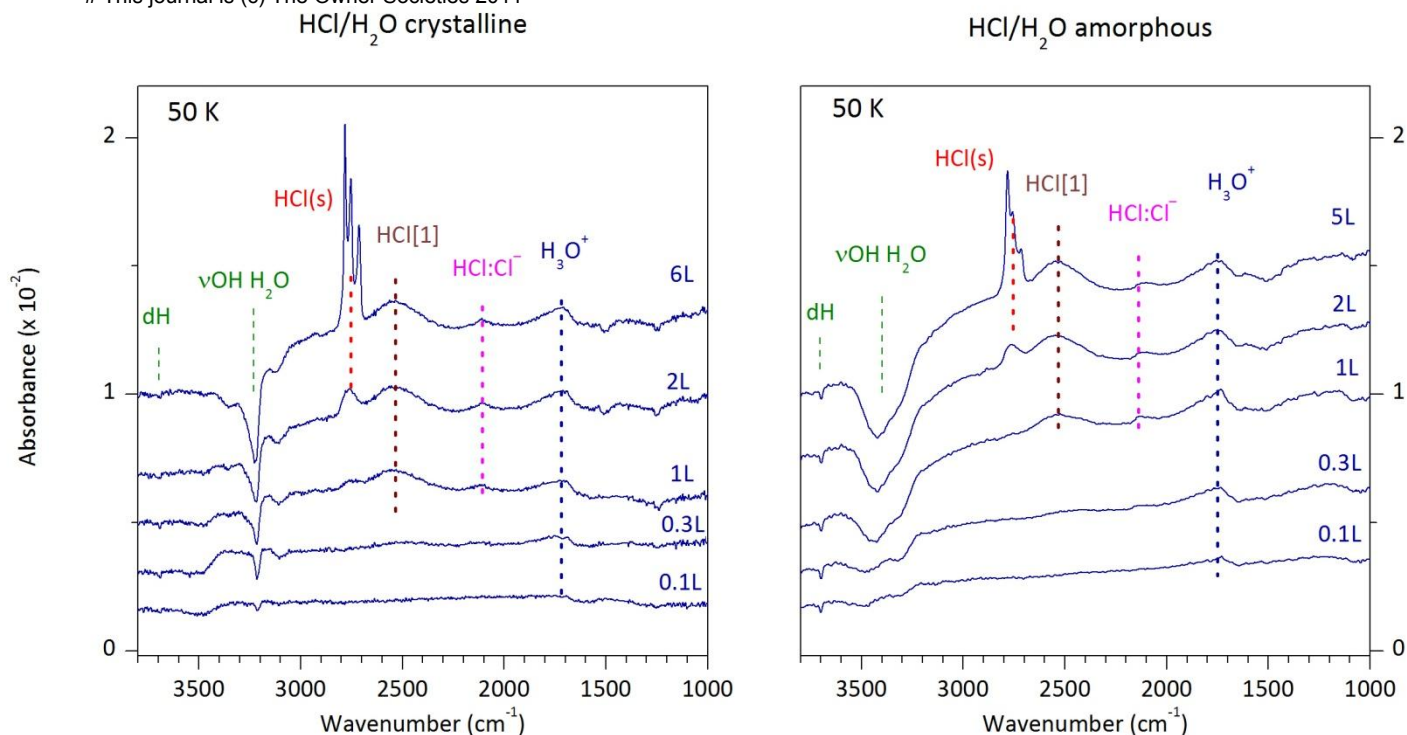
**Fig. S1**. Difference infrared spectra of a 4 ML crystalline (left) and amorphous (right) ice films exposed to HCl at 50 K. Qualitatively, the same adsorption mode are detected on the two substrates : $H_3O^+$, HCl: $Cl^-$, HCl[1] and HCl(s).

Ref 21

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