# IUPAC Task Group on Atmospheric Chemical Kinetic Data Evaluation – Data Sheet VI.A2.15 HET_SALTS_15

## IBr + Cl-/Br- $\rightarrow$ products

## Experimental data

| Parameter | [X]/ M | Temp./K | Reference | Technique/ Comments |
|---|---|---|---|---|
| Uptake coefficients: $\gamma, \gamma_{ss}, \gamma_0$ | | | | |
| $\gamma = (2.0\pm0.3) \times 10^{-3}$ | 2 (Cl-) 0.003 (Br-) pure water | 274 | Braban et al, 2007 | WWFT-EIMS (a) |
| $\gamma_0 = (1.8\pm0.2) \times 10^{-3}$ | | 274 | | |

## Comments

(a) The uptake of IBr $(0.2–1) \times 10^{12}$ molecules cm$^{-3}$) to aqueous surfaces was studied in the wetted-wall flow tube with MS detection at m/z = 144. Uptake was measured on pure water and with dissolved concentrations of Cl$^-$ (2M) and Br$^-$ (0.003M) to mimic sea water. Uptake was rapid and was gas phase diffusion limited in both cases, but on pure water the uptake coefficient reduced with increasing exposure length, indicating surface saturation. No gas phase products were observed.

## Preferred Values

| Parameter | Value | T/K |
|---|---|---|
| $\alpha_b$ | >0.01 | 298 |
| *Reliability* | | |
| $\Delta \log (\alpha)$ | ± 0.3 | 298 |

*Comments on Preferred Values*

The uptake of IBr into aqueous halide is the same as into pure water, and is solubility limited, with no detectable reaction products in the gas phase. The recommended accommodation coefficient is based on an analogy with ICl uptake on the same surfaces. The time dependent uptake coefficient is given by:

$$\gamma = \left\{ \frac{1}{\alpha} + \frac{c\sqrt{\pi}}{8HRT} \sqrt{\frac{t}{D_l}} \right\}^{-1}$$

with $\alpha_b = 0.016$ , $H = 24$ M atm$^{-1}$ and $D_l = 5.0$ x $10^{-6}$ cm$^2$s$^{-1}$ at 298 K.

# References

Braban, C. F.; Adams, J.W.; Rodriguez, D.; Cox, R.A., Crowley, J.N. and Schuser, G.: Phys. Chem. Chem. Phys., **9**, 3136, 2007.