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## A chemical probe technique for the determination of reactive halogen species in aqueous solution: Part 1 – bromide solutions

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**Abstract.** Reactive halogen species ( $X^* = X\cdot$ ,  $\cdot X_2^-$ ,  $X_2$  and HOX, where X=Br, Cl, or I) in seawater, sea-salt particles, and snowpacks play important roles in the chemistry of the marine boundary layer. Despite this, relatively little is known about the steady-state concentrations or kinetics of reactive halogens in these environmental samples. In part this is because there are few instruments or techniques that can be used to characterize aqueous reactive halogens. To better understand this chemistry, we have developed a chemical probe technique that can detect and quantify aqueous reactive bromine and chlorine species ( $Br^*(aq)$  and  $Cl^*(aq)$ ). This technique is based on the reactions of short-lived  $X^*(aq)$  species with allyl alcohol ( $CH_2=CHCH_2OH$ ) to form stable 3-halo-1,2-propanediols that are analyzed by gas chromatography. Using this technique in conjunction with competition kinetics allows determination of the steady state concentrations of the aqueous reactive halogens and, in some cases, the rates of formation and lifetimes of  $X^*$  in aqueous solutions. We report here the results of the method development for aqueous solutions containing only bromide ( $Br^-$ ).

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