

# Mass Spectrometric Study of Collision Interaction between Fast Charged Particles and NaCl Solutions

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In the past few years medical and biological applications of swift charged particles has received increasing attention owing to their peculiar manifestation of the so-called Bragg peak effect. Nevertheless, the fundamental of physchemicals and biological reactions in the atomic scale is not fully understood still at present. In this work, we study collision interactions between MeV energy fast ions and biological solutions by means of liquid beam technique combined with time-of-flight secondary ion mass spectrometry [1].

Secondary ions ejected from liquid targets of 0 ~ 5 M NaCl solutions were measured by bombarding 2.0 MeV He<sup>+</sup> ions. Fig.1 shows a typical spectrum of negative secondary ions ejected from a 5.0 M NaCl solution. One can easily see a series of negative cluster ions of the form X<sub>m</sub>Y<sub>n</sub>R<sup>-</sup>, where X and Y are neutral molecules such as H<sub>2</sub>O, NaCl, and NaOH and R<sup>-</sup> is a negative charged ion such as O<sup>-</sup>, OH<sup>-</sup>, and Cl<sup>-</sup>. Intensity variation of negative ions obtained as a function of the concentration indicates that the cluster structure in liquids changes drastically as the abundance of NaCl in solutions increases.

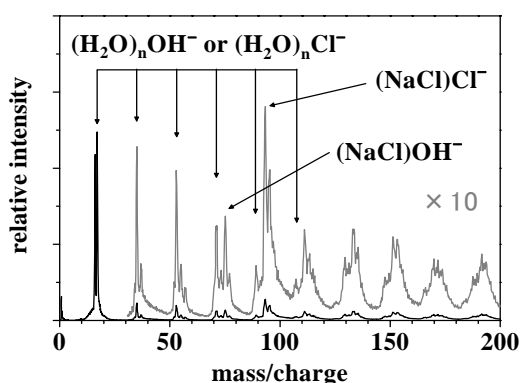


Figure 1: Negative secondary ion mass spectrum ejected from 5 M NaCl solutions bombarded by 2.0 MeV He<sup>+</sup> ions