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Aerosol formation by positive and negative ion recombination

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It has been pointed out that the recombination of atmospheric positive and negative cluster ions could form ultrafine particles. However, few experiments have been conducted to see the possibility of particle formation by ion-ion recombination. In this study, we measured particles formed by positive and negative corona discharges in SO₂/H₂O/Air mixtures. When positive and negative discharges were operated simultaneously, the formed particles were much more than the sum of the particles formed by individual positive and negative discharge. This result indicated that the recombination of positive and negative ions led to the particle formation. The particle formation was enhanced by the addition of NH₃. Therefore, the formation rate of particles was shown to be affected by chemical compositions of positive and negative ions.

Keywords: atmospheric ion, atmospheric aerosol, ion-ion recombination