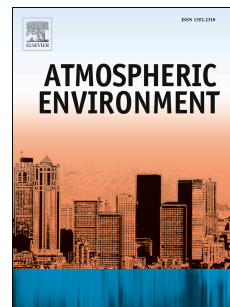


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A study on the microscopic mechanism of methanesulfonic acid-promoted binary nucleation of sulfuric acid and water

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1 **A Study on the Microscopic Mechanism of Methanesulfonic Acid-Promoted**
2 **Binary Nucleation of Sulfuric Acid and Water**

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13
14 **Abstract**

15 Methanesulfonic acid (MSA) is believed to play an important role in the formation and
16 growth of atmospheric organic aerosols and could facilitate the binary nucleation of sulfuric
17 acid (SA)–water (W). However, understanding of larger clusters formed by gas-phase MSA
18 with atmospheric nucleation precursors from microscopic aspect is lacking. In this work, to
19 study the microscopic mechanism of the ternary nucleation, the structural characteristics and
20 thermodynamics of MSA clusters with SA in the presence of up to six W molecules have
21 been investigated. It was found that MSA forms relatively stable clusters with SA and W
22 molecules and that acid dissociation plays an important role. The analysis of the atmospheric

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