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Corona Discharge Induced Rain and Snow Formation in Air

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To influence the weather is a long time dream of mankind. Current cloud seeding technology mostly relies on chemicals such as silver iodide and hygroscopic salts, which may have negative impacts on environment and human health. Here we present a new method for triggering macroscopic water precipitation in air. Experiments demonstrated that high-voltage generated corona discharge was able to induce rain and snow formation in atmospheric pressure air. The effect was confirmed by precipitation experiments performed in a 1 m3 and a 15,000 m3 cloud chamber, where the absolute water content was close to the actual values in natural cumulonimbus clouds. With the presence of electrical charges, the collision efficiency between the water droplets was increased by over one order of magnitude, accelerating the coalescence process and possibly leading to the rain and snow formation otherwise impossible to form. The electric-based technology presented in this paper provides an effective, inexpensive, and environmental friendly tool for triggering water precipitation, and may open up new opportunities for producing water precipitation in large open space.

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