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Synthesis, Deposition And Reactions Of Atomically Precise Clusters At Atmospheric Pressure By Spray Ionization

A low-cost, continuous process uses electrospray ionization and mild heat to create catalytically active metal nanoclusters at atmospheric pressure, eliminating the need for expensive vacuum chambers or chemical reducing agents.

Unprotected noble metal clusters appear to have many promising applications in fabricating composite films of polymers or inorganic metal oxides and small metal nanoclusters with high metal loading. Such nanoclusters are traditionally produced in vacuum using laser ablation, however, this procedure requires extreme pressures and multiple chemical agents to create stable clusters.

Researchers at Purdue University have developed a new method of producing metal clusters at atmospheric pressure. This method combines electrospray ionization of appropriately chosen salts with modest heat to achieve similar results at atmospheric pressure. This procedure eliminates the need for chemical reducing agents, i.e., lasers and vacuum chambers. The prepared surfaces can be catalytically active. This method requires only a mild condition for the production, and thus, it provides a continuous atmospheric pressure metal cluster ion source at a low cost.

Advantages:

- Ambient environment

- Prepared surfaces can be catalytically active

- Low cost

Potential Applications:

-Metal nanocluster chemistry

-Conversion of propylene to propylene oxide

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Category

Materials Science & Nanotechnology/Nanomaterials & Nanostructures

Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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