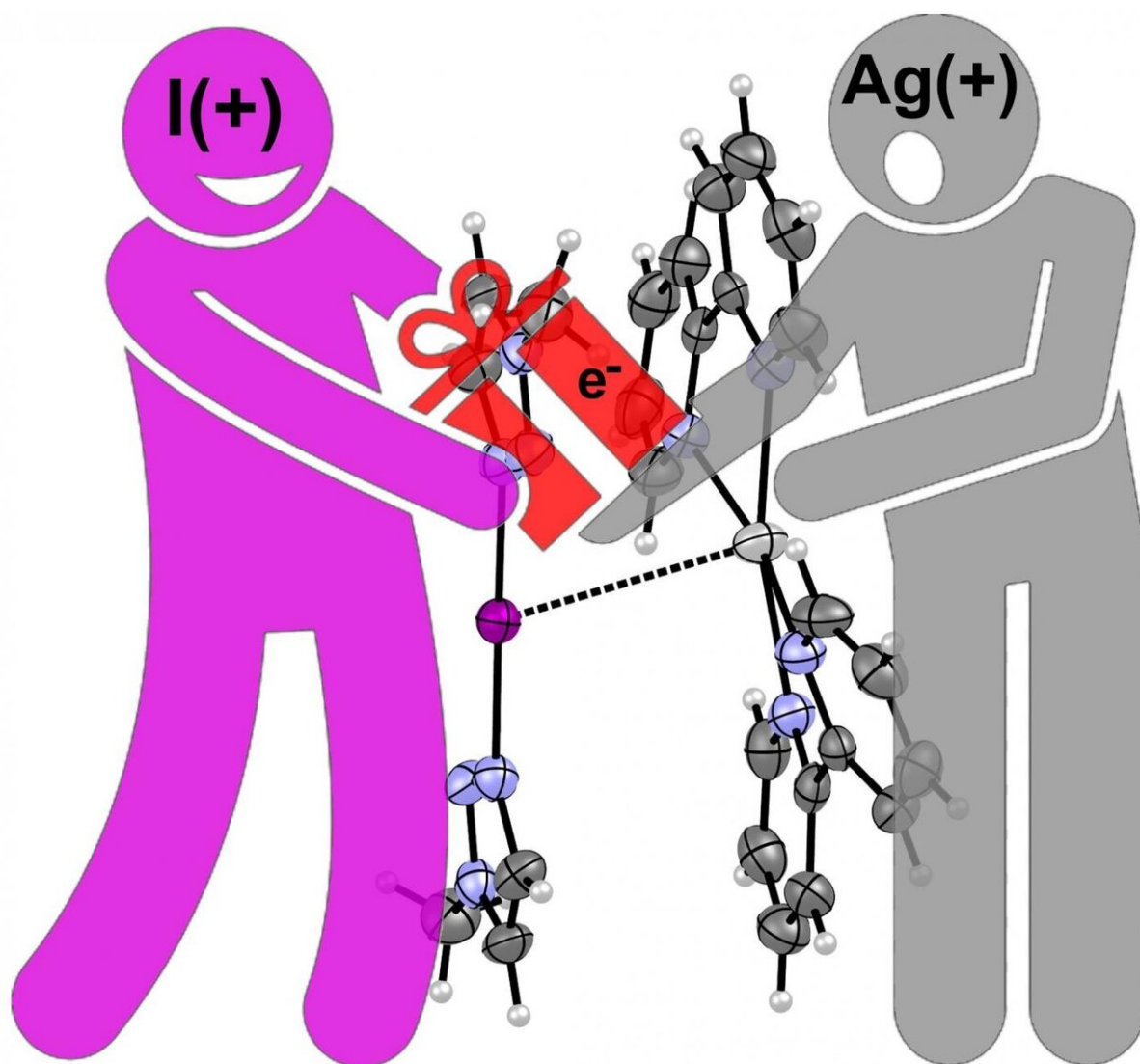


# Interaction between iodonium and silver cation demonstrated for the first time

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How it happens: Positive iodine gives an "electron gift" to positive silver. Credit: Antonio Frontera and Kari Rissanen

An international research team led by Professor Kari Rissanen of the University of Jyväskylä (Finland) and Professor Antonio Frontera of the University of Balearic Islands (Spain) has demonstrated that positively charged iodine (termed iodonium) is able to favorably interact with a silver cation ( $\text{Ag}^+$ ), overcoming the strong electrostatic repulsion. The research was published online in *Chem* journal February 8, 2021.

It is well known and intuitive that iodide ( $\text{I}^-$ ) has a strong affinity for  $\text{Ag}^+$ . For instance,  $\text{AgI}$  is one of the most insoluble inorganic salts due to the strength of their attractive electrostatic force. In fact, it is used to generate artificial rain ([cloud seeding](#)) because the crystalline structure of  $\text{AgI}$  is similar to that of ice (ideal nucleation agent).

However, the strong and counter-intuitive affinity of iodonium ( $\text{I}^+$ ) for  $\text{Ag}^+$  was not known until now. An international research group have succeeded in preparing and characterizing a supramolecular complex where  $\text{I}^+$  and  $\text{Ag}^+$  are in close contact, thus overcoming the intrinsic electrostatic repulsion of their positive charges. Remarkably, the  $\text{I}^+\cdots\text{Ag}^+$  interaction was demonstrated both in the [solid state](#) and in solution.

"The explanation provided is that the iodine atom, even as a positively charged cation, is able to generously donate electrons from its free electron lone pairs to the  $\text{Ag}^+$ . Therefore, no matter the electronic nature of [iodine](#), rich or poor, it seems its generosity toward the  $\text{Ag}^+$  is boundless," says Professor Kari Rissanen from University of Jyväskylä.

**More information:** Shilin Yu et al, A "nucleophilic" iodine in a halogen-bonded iodonium complex manifests an unprecedented  $\text{I}^+\cdots\text{Ag}^+$  interaction, *Chem* (2021). [DOI: 10.1016/j.chempr.2021.01.003](https://doi.org/10.1016/j.chempr.2021.01.003)

Provided by University of Jyväskylä

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