Atmospheric chemistry induced by sunlight

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Sunlight chemistry plays an important role in the global dynamics of atmospheric compounds taking part in their redox mechanisms by means of photochemically produced derivatives and photolytic reductive reactions. Thus, understanding the photochemical processes that these species may undergo is mandatory to accurately simulate their atmospheric cycle using global atmospheric models, which can evaluate the dispersion and accumulation of these species around the globe. However, the data we can find in the bibliography regarding the photochemistry of atmospheric compounds is sometimes scarce, leading to models and simulations that do not match field observations.

In this talk, we will highlight the importance of solar light absorption in atmospheric chemistry by reviewing recent advances in the photochemical properties of several systems of atmospheric interest. Over the last few years, we have explored the light-induced chemistry of atmospheric mercury (Hg), a potent neurotoxin of global concern, which primarily results in a fast gas-phase photolysis that can dominate atmospheric Hg reduction and increase its global atmospheric lifetime.[1-4] In addition, we have studied the photochemical properties and photodissociation pathways of key sulfur radicals in acid rain generation, a chemical mechanism of great importance in solar geoengineering plans to reduce the global temperatures of our planet.[5] These works, carried out by means of quantum chemical methods in conjunction with state-of-the-art global atmospheric models, reflect the major role that photochemical reactions can have in the fate of atmospheric species.

References

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