

Can Superalkalis and Superhalogens Improve the Efficacy of Redox Reactions?

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Abstract

Superalkalis have lower ionization energy than that of alkali atoms and superhalogens have higher electron affinity than that of halogen atoms. This property can be exploited to improve the efficacy of redox reactions that are routinely used in the scientific and industrial laboratories. Some of these reactions are theoretically studied and their thermodynamic parameters are analyzed. Alternatives to these reactions with the use of superalkalis and superhalogens are suggested by assuming similar behavior to that of their alkali metal or halogen analogues. Consequently, these reactions are analyzed, and their properties are compared to the existing reactions. Particularly, the change in reaction enthalpy, Gibbs free energy and their electrochemical potential are compared. Quantification of the reducing property of the superalkalis is also studied in the present situation by using an ionic equation. In all the cases, the results are promising and consequently, some of their applications are contemplated.

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