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Ambrish Kumar Srivastava

# Superhalogens

Properties and  
Applications

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आ नो भद्राः क्रतवो यन्तु विश्वतः

- ऋग्वेद

*Let noble thoughts come to me from all  
directions...*

—*Rig Veda*

# Preface

Halogens possess a very rich chemistry due to their high electronegativity, high electron affinity, and consequently, high reactivity. It was always interesting to explore whether any system can have more electron affinity than halogen. This led to the conceptualization of “superhalogen” in 1981 by G. L. Gutsev and A. I. Boldyrev, two scientists from Russia (then, USSR). After the experimental verification of this concept in 1999, the field became popular and also populated by works of other researchers from the USA, Poland, and China. This topic appeared very fascinating to me when I was admitted to the Ph.D. program in 2012. I immediately started working in this field, which led to my first publication in late 2013. There was a cluster of opportunities in the field. In 2016, I started communicating with Dr. Gutsev to work together on some problems. However, it could not be possible, partially due to a problem in the computational cluster and partially due to the submission of my Ph.D. thesis in the same year. Till 2020, I have published more than half a century of papers on various aspects of superhalogens. In 2021, I was invited to contribute an article for a special issue dedicated to Prof. Boldyrev. In 2022, I got the opportunity to edit an article collection on this topic having Dr. Gutsev as a co-editor to which Prof. Boldyrev’s group contributed as well. This field gave me much more than I expected. It was my turn to pay back to this field. I missed the lack of concise literature with the latest trends in the research in the field of superhalogen in the last two decades. This prompted me to plan this book in the form of the SpringerBriefs. This concise book is divided into seven chapters. Chapter 1 offers a general introduction to the subject including the basic idea and recent trends in the design of superhalogens. Chapter 2 exclusively discusses the design of transition metal core-based superhalogens. The subsequent chapters deal with the applications of superhalogens as strong oxidizers