

Preface

*If the idols of scientists were piled on top of one another
in the manner of a totem pole the topmost
would be a grinning fetish called Measurement*

Anthony Standen, *Science is a Sacred Cow*

Green chemistry is currently a field of great interest to many scientists, but is sometimes perceived as one rooted in descriptive language built around reducing waste and material recycling. This book seeks to outline a quantitative approach to green chemistry, at a level easily understood by upper-level undergraduates. It is written for students, and for university/college instructors seeking to “green” their courses by framing discussion around four principal metrics. In doing this, one will *REAP* the rewards of learning about Reaction mass efficiency, *E* factor, Atom economy, and Process mass intensity as measurement tools toward a more sustainable future.

These four metrics might be discussed within, for example, an organic synthesis course for chemistry students, or as part of a “stand-alone” green chemistry offering (the type of which is becoming more popular in education around the world). In addition, time is taken to cover more qualitative methods toward green chemistry assessment, and the notion of life cycle analysis. All of these concepts are presented in the context of cutting-edge academic and industrial case studies that showcase the state of the art. It is sincerely hoped that learning about these topics will empower students to make informed decisions regarding greener technologies in their future work.

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Green Chemistry Metrics

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Greenness

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