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Exploration of New Reactivities towards Future Sustainability

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The efficient making of new molecules is central to any new product in the pharmaceutical, materials science, microelectronics, and biotech industries. On the other hand, chemical manufacturing and chemical products have also affected us adversely from personal, local, national, and international scales. As a new philosophy over the last two decades, Green Chemistry through the 12 principles of green chemistry has emerged to develop the next generation of chemical science and technologies, as well as chemical products to meet such challenges in a proactive manner both environmentally and economically. Exploration of new chemical reactivities towards a sustainable future has been a long-term objective of our laboratory. We have explored various unconventional chemical reactivities that can potentially simplify synthesis, decrease overall waste and maximize resource utilization. Within the last decade, we have studied the development of various unconventional methodologies directed at increasing efficiency for multi-step chemical synthesis. Many of these new reactions can also be used to functionalize biomass directly.

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