

Surface Chemistry: Past Nobel Prize Triumphs and Future Possibilities

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Abstract

Surface chemistry represents a cornerstone in scientific and technological progress, focusing on the intricate interactions occurring at material interfaces. Historically, Nobel Prize-winning contributions have underscored its fundamental importance, from Gerhard Ertl's groundbreaking insights into surface chemical processes to the transformative impact of materials like graphene recognized in physics. Foundational principles encompass solid-gas, solid-liquid, and solid-solid interfaces, governed by energetics and thermodynamics pivotal in catalysis and environmental applications. Cutting-edge techniques such as spectroscopy, microscopy, and computational modeling have been instrumental, in shaping past achievements and guiding future explorations. Looking ahead, surface chemistry holds promise in catalytic innovations, nanomaterial synthesis, and sustainable technologies, poised to tackle global challenges through advancements in green chemistry. Recent breakthroughs in single-atom catalysts and plasmonic nanomaterials illustrate its evolving landscape, pointing towards future Nobel Prize-worthy discoveries that will continue to redefine scientific frontiers and societal progress.

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