Russian Chemical Reviews

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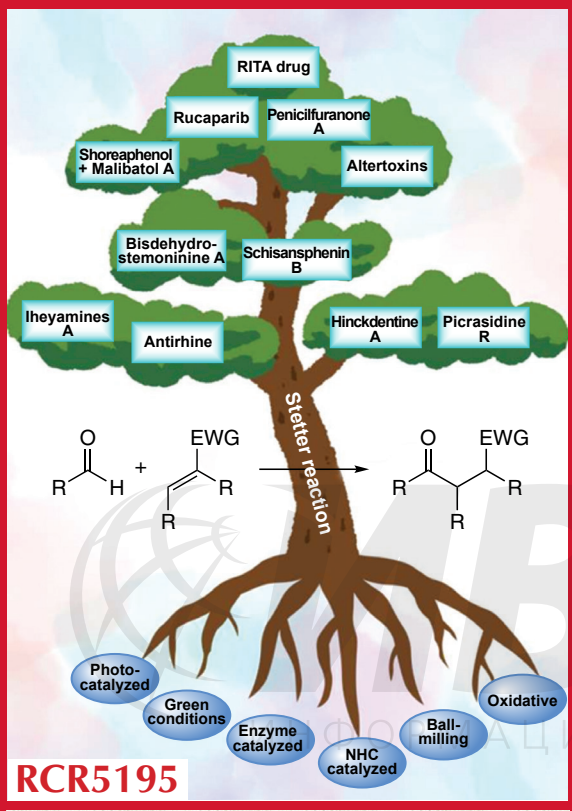

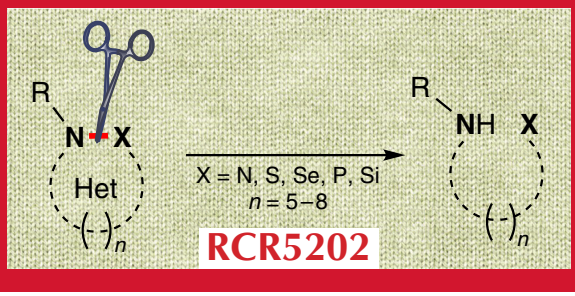

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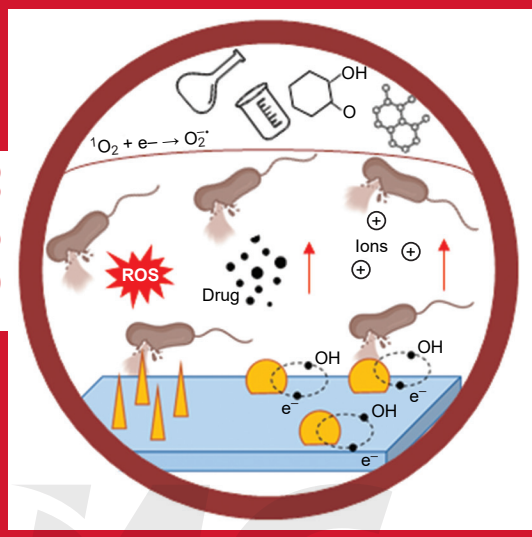

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and heterogeneous platforms based on them for local therapy. Particular attention is paid to factors that regulate the release of ions and therapeutic agents, generation of reactive oxygen species, and synergistic effects involved in these processes. The review also addresses the antibacterial mechanisms of action of nanoparticles and metal-containing complexes, nanoparticle toxicity and ways to minimize it, and bacterial defence mechanisms against ions and nanoparticles. The achievements of modern chemistry related to surface functionalization and immobilization of therapeutic agents aimed at developing highly effective antimicrobial surfaces are demonstrated. Critical analysis of drawbacks of the existing models for *in vitro* and *in vivo* assays of the antibacterial activity of biomaterials is given.
Bibliography — 361 references.

Base-mediated *C*-vinylation of ketones with alkynes: synthesis of β,γ-ethylenic ketones and their synthetic applications **RCR5206**

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This review summarizes the latest advances in the chemistry of β,γ-ethylenic ketones, which have emerged over the last decade as valuable synthetic building blocks to create molecules of high complexity and diversity. This family of multifunctional γ-aryl-β,γ-ethylenic ketones has now become accessible owing to the discovery and systematic development of a new general $C(sp^3)–C(sp^2)$ bond-forming reaction, namely superbase-mediated *C*-vinylation of ketones with alkynes. In the context of the Favorsky reaction (the addition of acetylenic carbanions to the carbonyl group of ketones), this discovery represents a chemical paradox in the form of temperaturecontrolled inversion of electrophilicity and nucleophilicity of acetylenes and ketones. Various transformations of β,γ-ethylenic ketones: nucleophilic addition reactions, inverse-electron-demand Diels–Alder reactions, reactions involving a carbonyl group followed by transformations of functionalized adducts, *etc*. are discussed. The review also highlights the cascade reactions, in which the *in situ* formed β,γ-ethylenic ketones, are key intermediates in the synthesis of various highly functionalized carbo- and heterocyclic systems.
Bibliography — 102 references.