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Solid-state electrolytes: a way to increase the power of lithium-ion batteries RCR5126

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Currently, all-solid-state lithium metal batteries are considered among the most promising energy storage devices, due to their safety and high energy density. Solid-state electrolytes, the key components of the batteries, are attracting increasing attention. This review presents an analysis of important recent advances in the field of lithium conductive solid-state electrolytes, including the mechanisms of conductivity, the main approaches to increase the conductivity, optimization of interfaces and ways to improve the stability for the main types of electrolytes, *i.e.*, inorganic, polymer and composite materials. For solid inorganic electrolytes, high conductivity and stability have been achieved; however, the problems related the formation of dense thin films and formation of a reliable contact with electrode materials are still unsolved. Polymer electrolytes are characterized by lower conductivity, which is improved upon plasticization with aprotic solvents. Composite electrolytes, for which it is possible to achieve a combination of high conductivity and good mechanical properties along with stability, are considered as the most promising. The main problems in the field of solid electrolytes for all-solid-state lithium metal batteries and possible ways to solve them are outlined.
Bibliography — 661 references.

Design of targeted antiviral polypeptides, specific to SARS-CoV-2. Challenges and prospects RCR5128

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The COVID-19 epidemic demanded the rapid development of high-affinity molecules of different types aimed at a single target, the S-protein of SARS-CoV-2. The simultaneous development and testing of such molecules provide a unique opportunity to compare the features of biotechnological platforms for creating therapeutic proteins. This review considers classical antibodies, variable lymphocyte receptors, single-domain antibodies, and artificial scaffolds (DARPins, affibodies, VH), that are compared in terms of affinity, neutralizing activity, size and compatibility with different delivery methods. It can be concluded that all platforms used have produced high-affinity proteins that specifically bind to the coronavirus S-protein. The highest affinity of the targeting molecules with the virus protein was achieved by developing classical antibodies, nanobodies and by combining several binding modules into multivalent constructs with high avidity. Based on the results of *in vivo* experiments, it can be concluded that a high affinity of the therapeutic protein for the surface antigens of SARS-CoV-2 is a necessary but not sufficient condition for suppression of COVID-19 due to the peculiarities of the biology of this virus. The experience gained in the development of therapeutic agents against coronavirus will be useful for design of effective targeted drugs for the treatment of known and new viral infections.
Bibliography — 126 references.