

New hydrophobic carbon quantum dots mediated antibacterial activity in various polymer matrix

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Nowadays, there is an increasing number of bacteria resistant to a wide range of antibiotics. At the same time, the frequency of nosocomial infections is increasing. This is due to the environment in which, for example, patients are, but also due to medical devices. Bacteria have the ability to quickly settle all surfaces and survive on them incredibly long - even for years. Therefore, it is necessary to remove this problem quickly and efficiently. An effective and ecological solution is to develop new antibacterial materials based on hydrophobic carbon quantum dots (hCQDs) in polymer matrices. Such nanocomposites are working on the principle of photodynamic therapy (PDT), which is already a common part of many medical as well as cosmetic treatments. Mechanical, photophysical, chemical properties and biocompatibility (cytotoxicity, proliferation and hemolytic tests), were studied on all used materials. Gram-negative and Gram-positive bacteria were used to monitor the antibacterial effect. This material is useful in a variety of applications, such as antibacterial windows and other surfaces, catheters, fibers for antibacterial sutures on the body surface, and many others [1-2].

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Figures

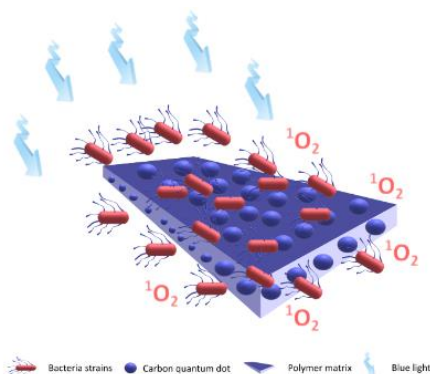


Figure 1. The mechanism of action of the polymer nanocomposite.