**High-k oxides coatings with antibacterial properties – new application in medicine**

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The increasing resistance of bacteria to antibiotics has become the dominant problem on a global scale and a serious challenge for modern medicine. For that reason, it is very important to develop new, effective and low-cost technologies enabling the development of new strategies aimed at the elimination of pathogenic bacteria. Recently, special attention has been paid to high-k oxides and their antibacterial properties, due to which they can find new application in in biology, medicine and food industry.

Atomic layer deposition (ALD) allows deposition of the thin films of high-k oxides on various materials, including temperature sensitive ones (e.g., perishable fabrics), equipment and instruments (including implants) used in hospitals. In the current study we evaluated the antibacterial properties of various high-k oxides (ZnO, HfO2, TiO2, ZrO2, Al2O3, AZO) deposited by the ALD. Testing of antimicrobial action was performed according to the agar disk diffusion method, commonly used to determine the sensitivity of bacteria to antibiotics. Paper discs coated with high-k oxides nanolayer were placed on the surface of the bacteria-covered medium. In the experiment reference bacterial strains, as well as wild serotypes were used. The efficiency of antibacterial properties of high-k oxides was evaluated by the extent of the area in which bacteria growth was inhibited.

In conclusion, antibacterial nano-coatings are a new alternative (to disinfectants and antibiotics) that could help to reduce the number of infections. Moreover, the low temperature of layer deposition opens a possibility to coat various multidimensional materials, such as soft tissue paper, fabrics, surgical instruments and other implements, thus promising a range of new potential applications in medicine, veterinary and broader health care.

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