

Standoff detection of pathogens with near infrared fluorescent nanosensors

Initiative: Integration molekularer Komponenten in funktionale makroskopische Systeme (beendet, nur noch Fortsetzungsanträge)

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Bacterial infections are one of the major causes of death around the world and an increasing problem due to antibiotic resistance. An ideal diagnostic tool could provide fast and reliable information about a bacterial contamination without sample taking, isolation, purification or culturing. So far, such a technology does not exist. In this project fluorescent nanosensors that are able to identify bacteria and meet these criteria will be developed based on near infrared (nIR) fluorescent single-walled carbon nanotubes (SWCNTs) as building blocks. SWCNTs fluoresce in the advantageous nIR region (850 -1700 nm) and will be chemically tailored to bind motifs that are released by bacteria or present on their surface. For that purpose both known recognition units and new screening strategies to identify organic phases on the SWCNTs that bind bacterial motifs will be used. Multiple sensors of different emission wavelength ('color') will be combined to fingerprint bacteria and to unambiguously identify and distinguish bacteria. The macroscopic nIR image of a surface coated with these sensors provides information about the presence of bacteria, which is essential for applications such as pathogen detection on medical instruments or in hospitals.

Projektbeteiligte

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