

Preface: Forum on Biocidal Materials & Interfaces

This issue of *ACS Applied Materials & Interfaces* features a Forum focused on the development and application of new materials and modified interfaces that are useful for killing unwanted and harmful microorganisms. There are several reasons why this area of applied materials and interfaces is receiving increased interest. First, during the past several decades, there has been an alarming increase in the incidence of nosocomial infection, which is often associated with methicillin resistant *Staphylococcus aureus* (MRSA) infection.^{1,2} Second, there is continued interest in the development of strategies for combating biological threat agents using nontraditional approaches to defeat a variety of pathological organisms and agents that may be dispersed in a battlefield or in a highly populated area during a terrorist strike.^{3–5}

The objective of this Forum is to provide the readership with a concise collection of articles in the area of applied materials and interfaces relevant to biocides and antibacterial action. Each paper in the Forum is authored by groups who are leaders in this research area. The collection includes focused research articles that highlight an investigation on a new approach to development of a biocidal material. In addition, the Forum also contains several Spotlight articles; these provide overviews of particular areas of biocidal materials and interfaces, focusing mainly on the groups' particular contributions, but also providing some review of relevant work by other groups in the area.

Although the set of papers appearing in the Forum was not solicited to highlight distinct topics in the field of biocidal materials, several clear themes emerge. Specifically, several papers highlight new approaches to imparting biocidal activity to polymer surfaces by surface grafting characteristic chemical functionality. The resulting materials find application as membranes, as surface modifiers for textiles and fabrics, and for controlling biofilm formation on tubing used in dental unit water lines. Two papers describe the development of new approaches to combating biofilm formation on metal surfaces, including an article that describes the use of poly-(amidoamine) dendrimers on titanium surfaces, which are important in joint replacement applications, and a Spotlight that overviews various strategies for coating metals with biocidal polymers to fight biofilm formation.

Taken together, the articles collected in the Forum on Biocidal Materials & Interfaces provides insight into the significant progress that is being made in the development of new approaches to fighting bacterial growth in liquid suspensions and biofilm formation on surfaces. While the systems being developed are different, there are clearly common themes that emerge, including the use of polymers that feature tetralkylammonium or halamine functionality as the focal point for biocidal activity. The work in this field is interdisciplinary, bringing together scientists and engineers working in fields such as biology, chemistry, and materials and polymer science, and the results have impact across a number of industries such as health, food, textiles, and defense. It is hoped that this forum will serve to inspire further interest and developments in this emerging area of interdisciplinary of science and engineering.

Kirk S. Schanze*

Department of Chemistry, University of Florida, Gainesville, Florida
32611, United States

AUTHOR INFORMATION

Corresponding Author

*E-mail: kschanze@chem.ufl.edu.

REFERENCES

- (1) Hiramatsu, K.; Cui, L.; Kuroda, M.; Ito, T. *Trends Microbiol.* **2001**, *9*, 486–493.
- (2) Zetola, N.; Francis, J. S.; Nuernberger, E. L.; Bishai, W. R. *Lancet Infect. Dis.* **2005**, *5*, 275–286.
- (3) Pile, J. C.; Malone, J. D.; Eitzen, E. M.; Friedlander, A. M. *Arch. Intern. Med.* **1998**, *158*, 429–434.
- (4) Lim, D. V.; Simpson, J. M.; Kearns, E. A.; Kramer, M. F. *Clin. Microbiol. Rev.* **2005**, *18*, 583–607.
- (5) Burnett, J. C.; Henchal, E. A.; Schmaljohn, A. L.; Bavari, S. *Nat. Rev. Drug Discov.* **2005**, *4*, 281–297.

Published: August 24, 2011