Editorial

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We are delighted to report a significant increase in the journal impact factor for *Surface Innovations*, which rose from 1.268 in 2018 to 2.333 this year. This is the third year in a row that the journal climbed in ranking. The journal is listed under two categories.

- *Materials Science, Coatings & Films*: The journal climbed from 14th to 6th position among 20 listed journals. Percentile improved from 74% (2018) to 30% (2019), which places the journal in the Q2 category. Only one journal currently separates *Surface Innovations* from the top Q1 journals.
- *Physical Chemistry*: The journal moved from 118th position to 78th among 148 journals. The percentile improved from 81% (Q4) to 53% (Q3), and the journal is only 3% from reaching Q2; for example, the *Langmuir* journal is among Q2 journals in this category.

Our long-term objective is to at least double the impact factor, but as the next small step in this positive direction, we would like *Surface Innovations* to move into the Q1 and Q2 percentiles in the above listed two categories next year.

The progress in journal ranking is the direct result of initiatives taken by the Editorial Office and Editorial Board members. The journal significantly increased its visibility and systematically attracts more quality original research reports, as well as invited feature articles. In the last couple of years, we have experienced an increase in the number of submissions, which influences the acceptance rate. For example, the acceptance rate was well above 90% in the first three years of journal operation, but has decreased to below 60% in the last two years. This larger rejection rate allows us to select high-quality submissions for publication in a limited number of issues, currently five issues per year. We expect the journal to continue with five issues in 2020.

This concluding issue of 2019 offers one innovation letter and eight original research articles.

In their short letter, the Israeli research team led by Professor Edward Bormashenko introduces the concept of a self-propelled rotator actuated by solutal Marangoni flow, in which rotation is stabilized by magnetic-field-induced deformation of the liquid surface, a phenomenon known as the Moses effect.¹ Besides the convincing experimental demonstration, the authors offer scaling analysis to uncover the effects of viscous dissipation and magnetic field on the rotator's angular velocity and rotational motion. This invention could open doors for future miniature mixers and robots operating on water surfaces.

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In their original research article, Dinc *et al.*² report fabricating three-dimensional (3D) titanium dioxide nanorod arrays through physical vapor deposition and then decorating them with gold nanoislands through a simple solid-state thermal dewetting process. Taking advantage of the dewetting process and varying the gold film thickness and annealing temperature, the inventors were able to manipulate nanostructure platforms. The gold-decorated nanostructures enhanced the Raman signal for the probe molecule methylene blue by up to two orders of magnitude, revealing their potential application for surface-enhanced Raman spectroscopy. The authors also demonstrate improved cytocompatibility and growth of osteosarcoma cells on the gold-decorated nanostructures, concluding that these platforms could find applications in tissue engineering.

To combat pathogenic bacteria, especially those that become highly resistant to antibiotics, the research team from Egypt discusses a possibility of using metal nanoparticles exposed to magnetic signals.³ They demonstrate the antibacterial effect of silver nanoparticles shaped as spheres, rods and prisms against *Klebsiella pneumoniae*. The bacterial growth rate, kinetics and enzymatic changes were further inhibited with the presence of pulsed magnetic signals. Coupling of magnetic signals with silver nanoprisms resulted in the most significant cellular injuries and damage to membranes of tested bacteria.

In the fourth contribution to this issue, Yang *et al.*⁴ introduce a novel dual-phase oxygen transport membrane made of samarium, strontium, cobalt, iron and gallium oxides with good oxygen permeability and structural stability in carbon dioxide atmosphere. Compared to other reported dual-phase membranes, their invention possesses a higher oxygen permeation flux and stability, reaching 0.62 mL/(min·cm²) oxygen flux at 900°C. This dual-phase porous ceramic membrane is a promising invention for air separation to provide pure oxygen for many applications where oxygen is required, including clean energy projects, methane partial oxidations, and so on.

The research team from the Chinese Academy of Sciences investigated tellurium-induced intergranular cracking of nickel-based alloys at 900°C using synchrotron radiation-based microprobe techniques (micro-X-ray fluorescence, micro-X-ray diffraction and micro-X-ray absorption near-edge structure analysis) and density functional theory calculations.⁵ Nickel-based alloys are used in nuclear reactors, and intergranular cracking deteriorates their mechanical properties and shortens the lifetime in service. The authors demonstrate enrichment of tellurium at the grain boundaries. They also found that weak nickel–tellurium covalent bonds with

unstable anti-bonding character form during the tellurium corrosion process, which might be the reason for the weak structural stability of the nickel–tellurium alloy caused by intergranular embrittlement.

The contribution from Zhang *et al.*⁶ is devoted to investigating molecular interactions between single-wall carbon nanotubes and polymer chains of polyacrylic acid, poly(methyl acrylate) and poly(methyl methacrylate) using molecular dynamics simulation. The authors found that the orientation angle of polymer chain versus carbon nanotube axis changes the interactions from attractive at lower angles to repulsive at higher angles. As a result, the polymer chains should prefer to be aligned along the nanotubes. This finding could benefit design of carbon nanotube/polymer nanocomposites with improved structures and properties.

According to the research team from the Kunming University of Science and Technology in China, expired medications are an attractive high-purity feedstock of raw materials and elements and can be used in the formulation of new chemicals.⁷ Reuse of expired medical tablets also eliminates environmental concerns regarding disposal of medications. In their report, Liu *et al.* describes a high-temperature solid-state technology for synthesizing a magnesium-doped lithium iron phosphate/carbon (Mg-doped LiFePO₄/C) material using waste lithium carbonate and ferrous sulfate tablets. Cathodes coated with Mg-doped LiFePO₄/C nanoparticles exhibited high electrochemical lithium-storage performance and could be used in lithium-ion batteries. The economic analysis performed by the authors suggests that this novel recycling technology is highly feasible.

The contribution by Manning *et al.*⁸ focuses on self-regulating membranes inspired by vapor transport regulation by stomata on cactus epidermal surfaces. This paper quantifies the role of macroscale hydration on the microscale morphology of the fracture network, through controlled plant dehydration experiments along with surface wetting and morphological characterization. A network of epicuticular wax micro-fractures (cracks) on the surface of *Opuntia* cactus cladodes shows seasonal-hydration-induced morphology and modulation of vapor transport. The authors performed controlled dehydration experiments and microscale imaging of plants harvested during wet and dry seasons and showed changes in the dimensions of cracks. These cracks act as secondary vapor pathways, exemplifying a hierarchical design to mediate water vapor loss from the surfaces.

In the last contribution to this issue, Liu *et al.*⁹ describe the use of molecular dynamics simulations to study adsorption characteristics of water molecules and fatty acids at the magnesium hydroxide/water interface. This systematic theoretical work reveals affinity of fatty acids and water to different crystallographic planes of magnesium hydroxide crystals. The simulation results benefit both the wet magnesium hydroxide surface modification method and understanding interfacial mechanisms that occur during the concentration of brucite using froth flotation separation method.

We are looking forward to your exciting new scientific and engineering submissions and we welcome your feedback on the content of this issue, as well as other issues of *Surface Innovations*.

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