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Editorial

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Editorial

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It is our great pleasure to report that Professor Mietek Jaroniec, member of the *Surface Innovations* Editorial Board, was awarded with the title of *Doctor Honoris Causa* by Poznan University of Technology (Politechnika Poznańska) in Poland on 29 November 2018 for his life-long scientific achievements in the areas of chemistry of materials and physicochemistry of surfaces (Figure 1). This is his fourth Honorary Professor title after receiving it from three other Polish universities, including Marie Curie-Skłodowska University in Lublin in 2005, Copernicus University in Torun in 2009, and Military University of Technology in Warsaw in 2010. Our congratulations to Professor Jaroniec! We wish him many more years of amusement with surfaces and interfaces.

We are also pleased to report that ICE Publishing sponsored the inaugural *International Symposium on Advanced Materials and Sustainable Technologies* (AM&ST 2018) that was held in Brisbane, Australia, on 22–25 July 2018. The programme included eight plenary and 24 keynote addresses, and over 130 oral and poster presentations on topics related to multiscale materials design, synthesis, characterization, manufacturing, functionalization and surface modifications, as well as on emerging materials in applications of sustainable energy and environmental technologies. The meeting was attended by 193 participants. Two *Surface Innovations* Poster Awards were offered during the AM&ST 2018 symposium, which were selected by an independent award committee led by Dr Jennifer MacLeod, co-chair of the meeting. The award recipients included Dr Yueying Li from Shenzhen Institute, Peking University, China, for her poster entitled ‘Preparation of single-phase Ti_2AlN coating by magnetron sputtering with cost-efficient hot-pressed Ti-Al-N targets’ (Figure 2(a)), and Yin Zhang from Queensland University of Technology, Australia, for her poster ‘Electronic structure investigations of LiFePO_4 and FePO_4 : combined theoretical and experimental perspective’ (Figure 2(b)). Congratulations to Dr Li and Ms Zhang! We wish both ladies long-lasting success in research and discoveries.

This first issue of 2019 includes eight original technical contributions on random topics related to surfaces and coatings. Li *et al.*¹ describe a novel cost-efficient hot-pressed Cr-Al-C target rather than a stoichiometric bulk Cr_2AlC ceramic target that they used to prepare a dense and crack-free Cr_2AlC coating via arc ion plating method. The multilayer structure formulated had minimal chromium carbide content and strength and adhesion

Figure 1. Professor Mietek Jaroniec during a ceremony of receiving the *Doctor Honoris Causa* certificate from the President of Poznan University of Technology, and taking off ribbon covering his name from the list of 40 scientists awarded with the Honorary Professor title by Poznan University of Technology in its 100 year history (© Poznan University of Technology)

Figure 2. Recipients of the *Surface Innovations* Poster Awards during the AM&ST 2018: (a) Dr Yueming Li; (b) Ms Yin Zhang

that met the requirements of a high-temperature protective coating.

The electrode materials are essential to capacitive deionization (CDI) performance. To achieve effective CDI, the electrode materials should have a high specific surface area, good electrical conductivity and manageable pore structure. Song *et al.*² report an interesting method to prepare freestanding, binder-free and continuous carbon nanotubes (CNT) film electrodes by a pyrrole-modified chemical vapor deposition (CVD) method. The obtained CNT film demonstrates impressive CDI performance, including high adsorption capacity and stable cycling performance. The electrosorption capacity of the CNTs film electrode was greatly improved compared with the pristine CNTs film, showing the great potential in CDI applications.

Much effort has been devoted in search of high-performance electrode materials for lithium (Li)-ion batteries, which could also have additional advantages of being environmentally friendly and sustainable. The paper by Dai *et al.*³ reports attempts to fabricate anode material for Li-ion batteries using an expired medication, aminophylline. Although the galvanostatic charge/discharge and cyclic voltammetry results for this new electrode material are not yet superior to other organic electrode materials reported in the literature, the concept of using recycled medicine as electrode material is encouraging and inspiring.

In another paper from the same research group, Yao *et al.*⁴ demonstrate how to combine the values of inorganic and organic components at the molecular scale and formulate a novel metal-organic framework material. They synthesized zinc L-phenylalanine chelate nanofibers by a facile liquid phase precipitation reaction, followed by lyophilization. This zinc L-phenylalanine chelate nanofibers were tested as an anode for lithium ion batteries and showed satisfactory electrochemical

performance. The authors also discuss a possible Li-storage mechanism of the zinc L-phenylalanine chelate anode.

The paper by Vieira *et al.*⁵ presents the fabrication and characterization of two types of multilayer diamond films. The authors grew multilayered diamond coatings on pretreated WC-Co substrates by hot-filament CVD (HFCVD). For this purpose, they have prepared two types of multilayer coatings: (i) three-layers (alternating nanocrystalline and microcrystalline diamond films) and (ii) five-layers (alternating ultrananocrystalline and microcrystalline diamond films). The well-adhering CVD diamond multilayer coatings could find applications in diamond-coated tools for machining.

The article by Wang *et al.*⁶ is devoted to the synthesis and research of new materials possessing semiconducting and catalytic properties. The manuscript reports the preparation of copper(II) oxide quantum dots scattered over the surface of nanofibers made of amorphous silicon oxide. This new photocatalytic material showed efficient photodegradation of potassium ethyl xanthate under incandescent light. Xanthates are collectors used in processing of minerals during flotation separation and polluted water discharged from mineral processing plants.

The ionic conductivity of poly(methyl methacrylate) modified with a variable concentration of a propylene carbonate plasticizer and nano-sized silicon dioxide was studied by Sharma *et al.*⁷ Solid polymer electrolytes that the authors formulated exhibit impressive conductivity that is only slightly affected by the temperature and remains stable over a period of one month. It appears that the formulated solid polymer electrolytes could find applications in solid-state batteries and fuel cells.

Huang *et al.*⁸ share their study on titanium carbide-reinforced nickel-based alloy coatings for steels, prepared by high-frequency induction cladding. They demonstrate that their coatings are well bonded to the steel substrate. These coatings can effectively resist fatigue corrosion fracture due to excellent wear and corrosion resistances. The coating microstructure is compact and free of defects, showing microhardness of 2.7-times higher than 35CrMo steel, and excellent tribological properties.

We hope that everyone will enjoy reading the content of this issue.

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