Abdelrahman Zkria AHMED, PhD
Associate Professor
Faculty of Engineering Sciences
Kyushu University, Fukuoka, Japan
Email: abdelrahman_zkria@kyudai.jp ;
Webpage: https://www.abdelrahmanzkria.com
LinkedIn: https://www.linkedin.com/in/abdelrahmanzkria

Bio:

Prof. Abdelrahman Zkria is an Associate Professor of Engineering Sciences at Kyushu University. A Faculty member of the Department of Internationalization and Future Conception (IFC). He worked as an Associate & Assistant Professor at the Center for Japan-Egypt Cooperation in Science and Technology, Kyushu University (2020 to 2023,). Before that, he was a JSPS Postdoctoral Fellow at Kyushu University (2017 to 2019). He also joined the MSE Dept., North Carolina State University, USA, as a visiting scientist (Nov. 2018 to Mar.2019).

Prof. Abdelrahman obtained his Ph.D. in Applied Physics from Kyushu University in 2017. M.Sc. degree in Nanophysics and Solid-State Physics from the University of Graz, Austria, and Aswan University, Egypt, in 2012. His research group at Kyushu University is developing nanodiamond films for various applications, including electronic devices, anticorrosion coatings, and implants. He has more than 45 journal papers and 15 talks at international conferences.

Lecture [1]: Department of Material Sciences and Engineering, National Taiwan University [Monday 17th February 2025 from 10:50 AM]

Title: Synthesis of Quenched-produced diamond (Q-dia.) by Physical Vapor Deposition: Sustainable Approach for Modern Applications

Abstract

Diamond and related materials hold immense potential for applications in electronic devices, heat sinks, hard coatings for mechanical tools, and tribological and functional coatings for biomedical components. At Kyushu University, our research group has successfully developed nanodiamond/amorphous carbon (ND/a-C) composite films composed of numerous nanoscale diamond grains embedded in an amorphous carbon matrix. These films are synthesized using a physical vapor deposition technique known as coaxial arc plasma deposition.

Through further process optimization, we have recently achieved the growth of films that closely resemble CVD-grown polycrystalline diamond films—remarkably, at room-temperature substrate conditions. We have termed these films "quenched-produced diamond" or "Q-dia." The ability to grow Q-dia at low temperatures opens up diverse application possibilities. This presentation will cover the growth process of Q-dia films using the physical vapor deposition method and explore their potential applications in semiconductor materials, ohmic electrodes, hard coatings, biomedical coatings for dental implants, and chemical electrodes.

Lecture [2]: Department of Engineering and System Science, National Tsing Hua University
[Wednesday 19th February 2025 @ 3:30 PM in our department's NE69 Lecture Hall]

Title: **Carbon-based nanomaterials for Energy and Environmental applications**

Abstract: Carbon-based nanomaterials, including graphene, carbon nanotubes, and nanodiamonds, have emerged as key materials for energy and environmental applications due to their exceptional electrical, thermal, and mechanical properties. This lecture introduces the synthesis, functionalization, and application of these nanomaterials in energy storage, catalysis, and environmental remediation. More details will be given on the nanodiamonds thin films grown by physical vapor deposition, so called "quenched-produced diamond" or "Q-dia." at Prof. Abdelrahman's research group at Kyushu University in Japan. This lecture will cover the growth process of Q-dia films and explore their potential applications in semiconductor materials, ohmic electrodes, hard coatings, biomedical coatings for dental implants, and chemical electrodes.

Lecture [3]: Department of Material Sciences and Engineering, Feng Chia University
[Wednesday 26th February 2025@ 10:10 AM]

Title: **Research activities on Diamond-related materials at Kyushu University**

Abstract:

Diamond and its related materials offer significant potential for use in various applications, including electronic devices, heat sinks, hard coatings, as well as tribological and functional coatings for biomedical applications. At Kyushu University, our research group has developed nanodiamond/amorphous carbon (ND/a-C) composite films, which consist of nanoscale diamond grains embedded within an amorphous carbon matrix. This presentation will cover the growth process of nanodiamond films, so called Q-dia using the physical vapor deposition method and explore their potential applications.

Lecture [4]: Institute of Materials and Chemicals Engineering, Industrial Technology Research Institute (ITRI) [Thursday 27th February 2025@ 10:00 AM]

Title: Formation of Quenched-produced diamond (Q-dia.) by sustainable Coaxial Arc Plasma Deposition method for various Applications

Abstract:

Diamond and its related materials offer significant potential for use in various applications, including electronic devices, heat sinks, hard coatings, as well as tribological and functional coatings for biomedical applications. At Kyushu University, our research group has developed nanodiamond/amorphous carbon (ND/a-C) composite films, which consist of nanoscale diamond grains embedded within an amorphous carbon matrix. These films are fabricated using coaxial arc plasma deposition, a physical vapor deposition technique that enables precise control over film composition and properties. Through further process optimization, we have recently achieved the growth of films that closely resemble CVD-grown polycrystalline diamond films—remarkably, at room-temperature substrate conditions. We have termed these films "quenched-produced diamond" or "Q-dia." The ability to grow Q-dia at low temperatures opens up diverse application possibilities. This presentation will cover the growth process of Q-dia films using the physical vapor deposition method and explore their potential applications in semiconductor materials, ohmic electrodes, hard coatings, biomedical coatings for dental implants, and chemical electrodes.