

公益社団法人 応用物理学会
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応用物理学会北海道支部講演会のお知らせ

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下記講演会を開催いたしますので、多数ご参加下さいますようお願い申し上げます。

【 演題 】 A new face of well-known materials: Unconventional memristive devices

【 講師 】 Konrad Szaciłowski

AGH University of Krakow (Poland), Professor

【 日時 】 2024年4月30日(火) 16:30 ~ 18:00

【 講演開催場所 】 北海道大学量子集積エレクトロニクス研究センター
セミナー室 (3F 304室)

【 共催 】 北海道大学量子集積エレクトロニクス研究センター、学術振興会拠点形成プログラム「マテリアル知能」、応用物理学会北海道支部

【 講演の要旨 】 Rapid development of high-performance computing and advanced consumer electronics requires large quantities of high purity semiconductors, noble metals and rare-earth elements. Increasing prices and reduces availability of these materials should motivate advanced recycling protocols as well as development of new computing paradigms and technologies, based on Earth-abundant materials.

Memristive and the recently proposed memfractive systems have been shown to display basic features of neural systems such as synaptic-like plasticity and memory features, so that they may offer a diverse playground to implement synaptic connections. Their combination with reservoir computing approaches can further increase their versatility. It is possible since reservoir networks do not require extra optimization of internal connections. Therefore, new materials, presenting a diversity of electric properties are so needed. Here we focus on fabrication and characterization of new materials, which, along with simple solution processability, provide diverse switching mechanisms and current-voltage characteristics, thus offering new playgrounds for neuromorphic research.

The key problem is understanding the relation between molecular structure and computational performance of devices. Here we present an overview of various materials (natural, bio-derived and synthetic) which prove their applicability in fabrication of

memory and synaptic devices. We introduce some preliminary studies on memristive devices based on unusual materials: coordination compounds of common transition metals, derivatives alkaloids and other biomolecules and other materials, which are not commonly considered as useful in information processing. At the moment they do not offer outstanding performance, but may pave the way towards environmentally-friendly and cost-effective devices, especially for niche applications.

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