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# Robust resistive memory devices based on solution processable metal co-ordinated azo-aromatics

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Resistive memory devices can be broadly defined as electrical switches that retain a state of internal resistance based on the history of applied voltage. Such devices hold several performance characteristics that can potentially exceed conventional integrated circuit technology and are projected as the building blocks in next generation of computing architectures. Organic resistive memories suffer from insufficient consistency, stability, endurance and lack of understanding of the operating device mechanisms. These difficulties need to be overcome to furnish a good candidate for commercial applications. Here we describe a reproducible, stable and endurable resistive memory device with a spin-coated active layer of transition metal complex contacted with electrodes, prepared by standard methods. Insight into the in operando molecular properties of the device is obtained via *in situ* Raman-spectroscopy in conjunction with UV-VIS spectroscopy and spectro-electrochemistry allowing us to determine the molecular structure at each conductance state and thus the mechanism of switching. Density functional theory (DFT) calculations support our experimental findings and provide further insights into the switching mechanism of the devices at the molecular level. This insight provides opportunities for ligand engineering and we demonstrate rewritable resistive memory devices with multistate memory functionality.

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## Biography

Jens Martin has obtained his PhD from the University of Tübingen, Germany. He has then worked almost 3 years in the R&D Department of Omicron Nanotechnology, Germany. He has also worked at the Weizmann Institute, first as Postdoctorate then as Research Associate. Further, he had worked for 3 years at Harvard University as a Research Associate and Teaching Fellow. Later, he became Lecturer at the Graphene Center at the University of Exeter, UK, before joining the NUS Graphene Center as an Associate Professor. His research interests include low dimensional electronic systems, electronic interactions, scanning probe microscopy and most recently electronic conduction through molecular thin films.

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