

Developing Metrology for Memristors in Composite Materials: A Step Towards Sustainable and Scalable Electronics

Satish^{1,2}, Suraj P. Khanna^{1,2}, Akash Kumar^{1,2}, Hemavathi A^{1,2}, C. K. Suman^{1,2}, Wesley H Lohr³, Ravi L. Hadimani³, and Nandan Kumar⁴

¹Electrical and Electronics Metrology Division, CSIR-National Physical Laboratory, New Delhi, India

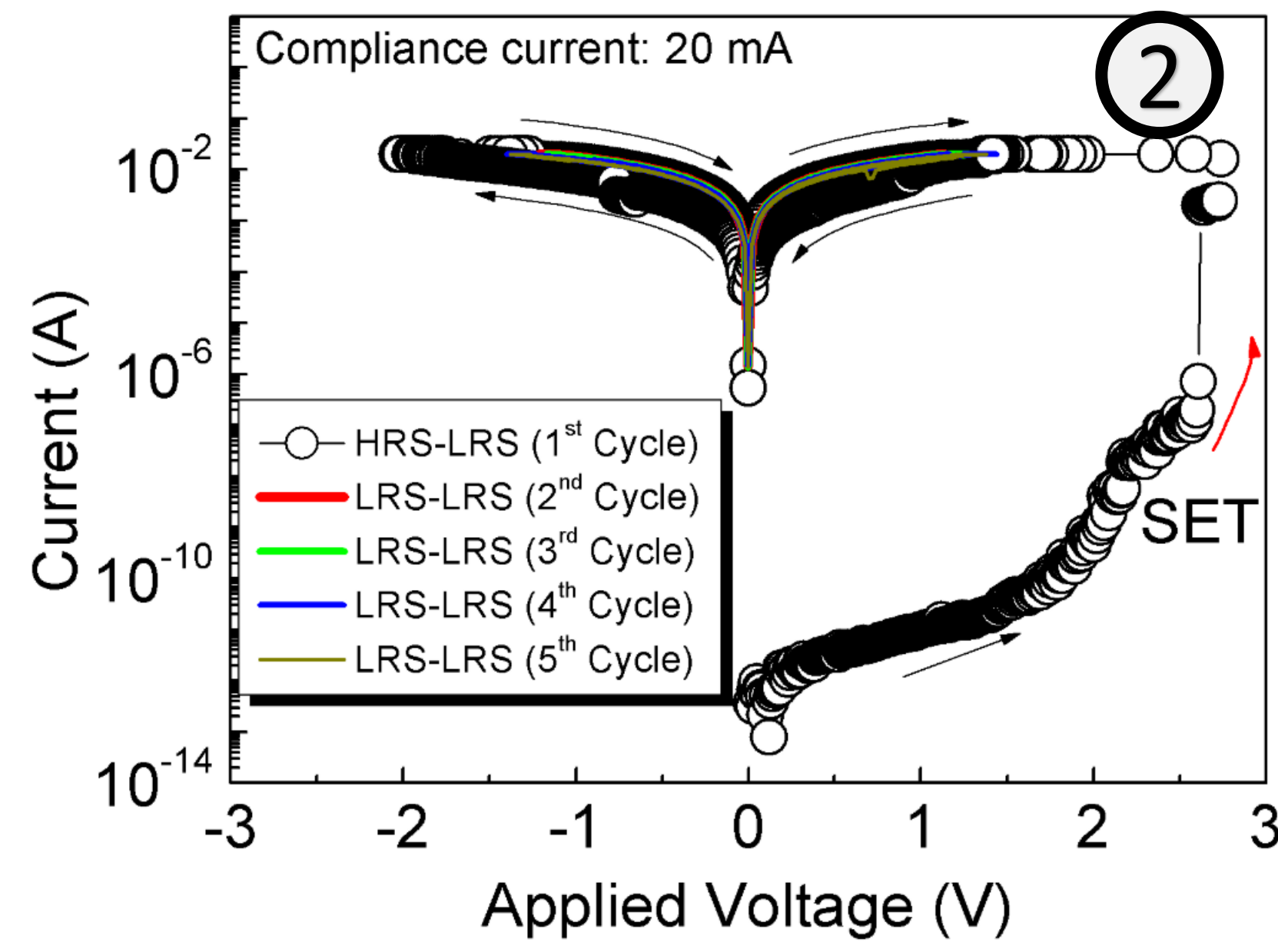
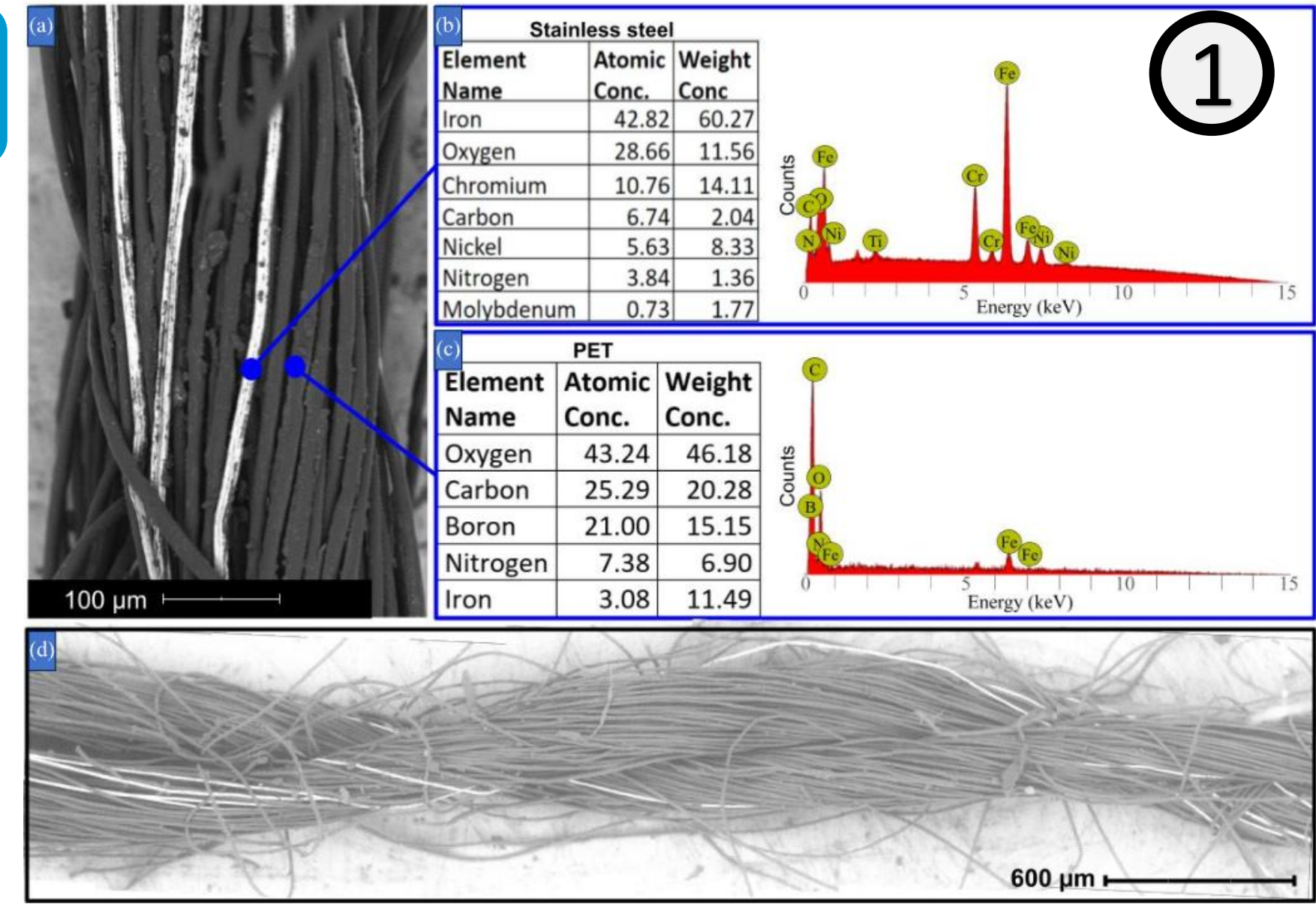
²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, India

³Biomedical Engineering, Virginia Commonwealth University, Richmond, VA 23284 USA

⁴High Performance Textiles Private Ltd., Panipat, India

INTRODUCTION

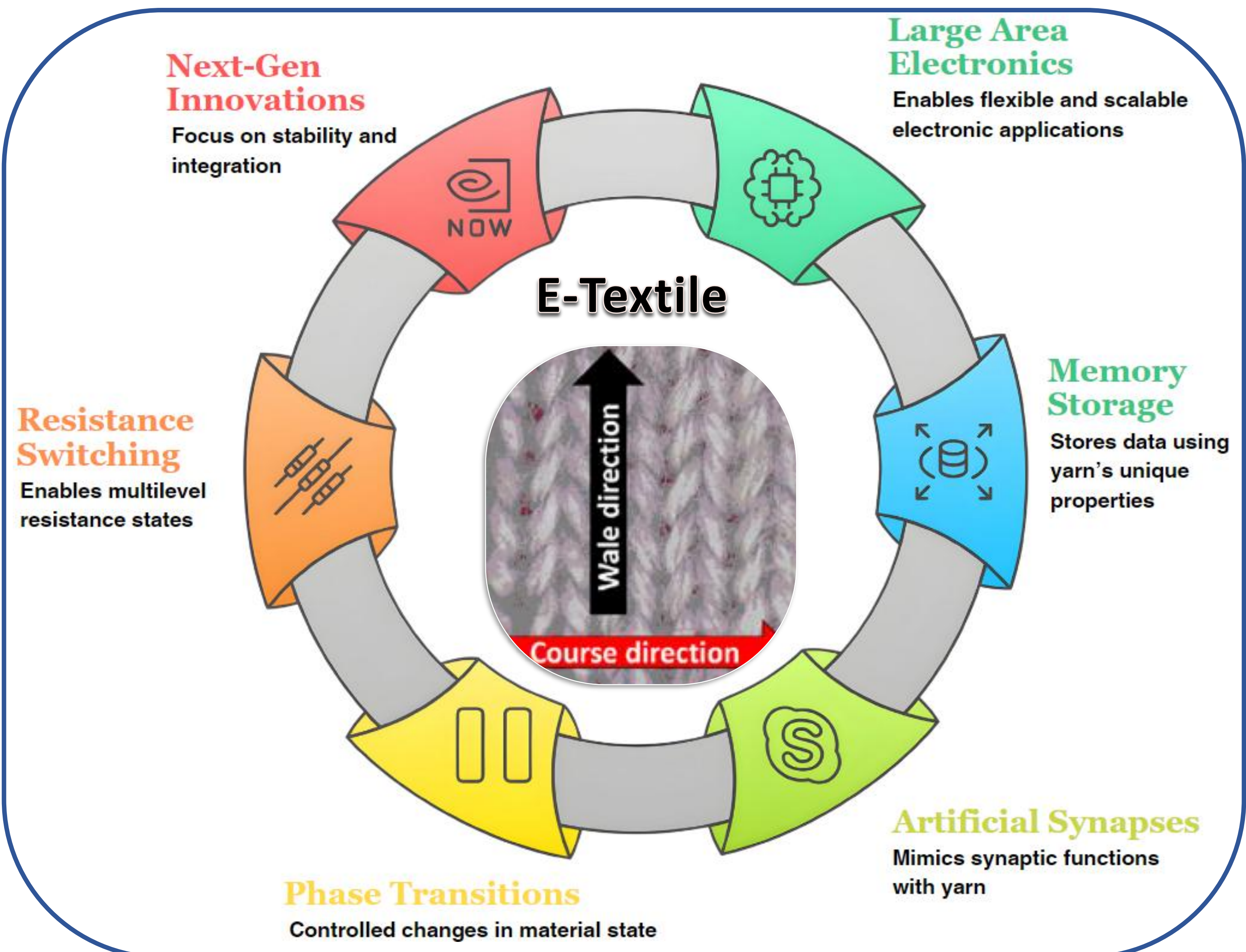
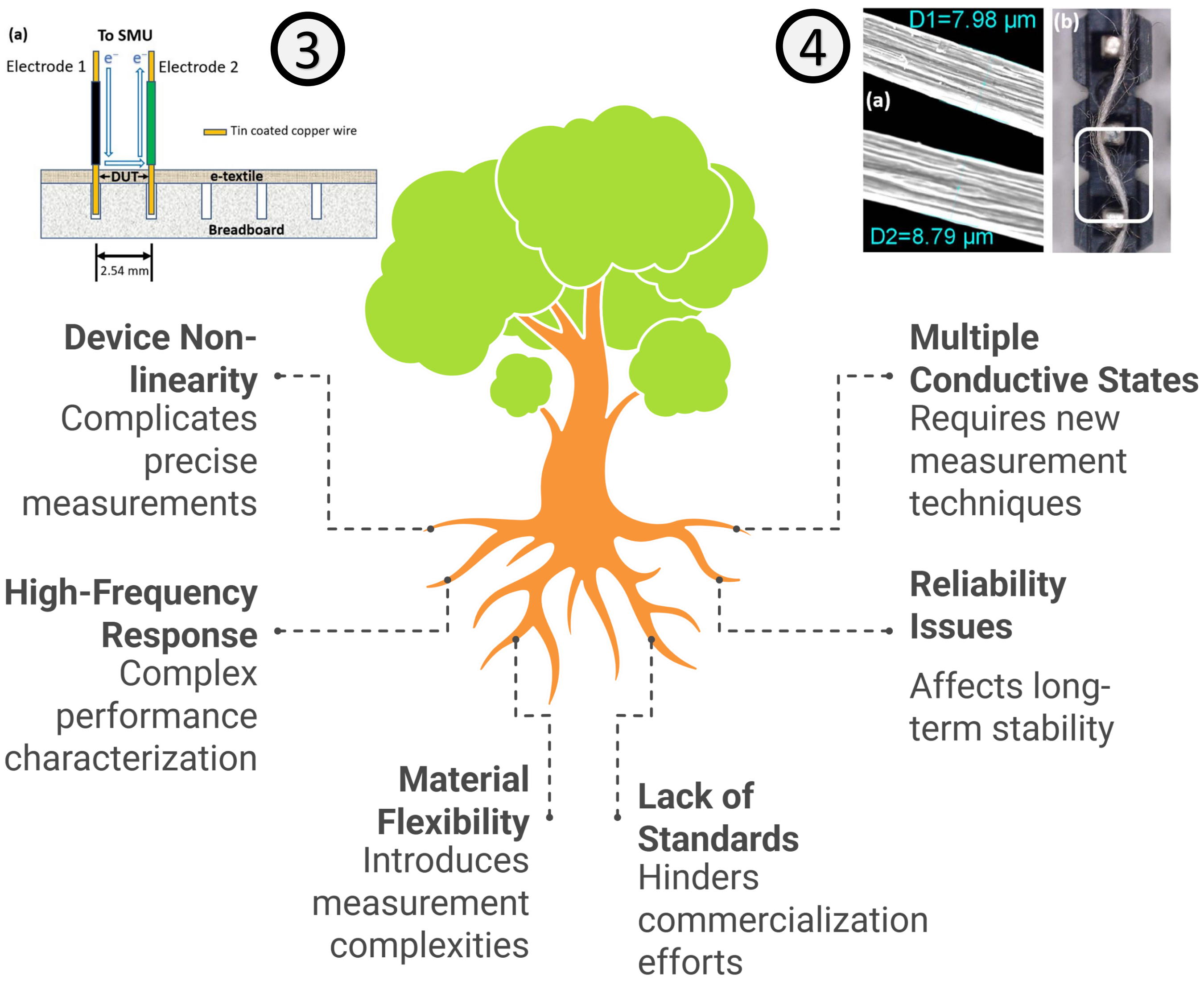
- ❑ Demonstrated the memristor (4th fundamental circuit element) in commercial composite materials.
- ❑ Unique resistance-switching, non-volatility and low-power consumption.
- ❑ **Lack of International measurement standards:** Unlike traditional resistors, capacitors and inductors, memristors do not yet have well-established metrology.



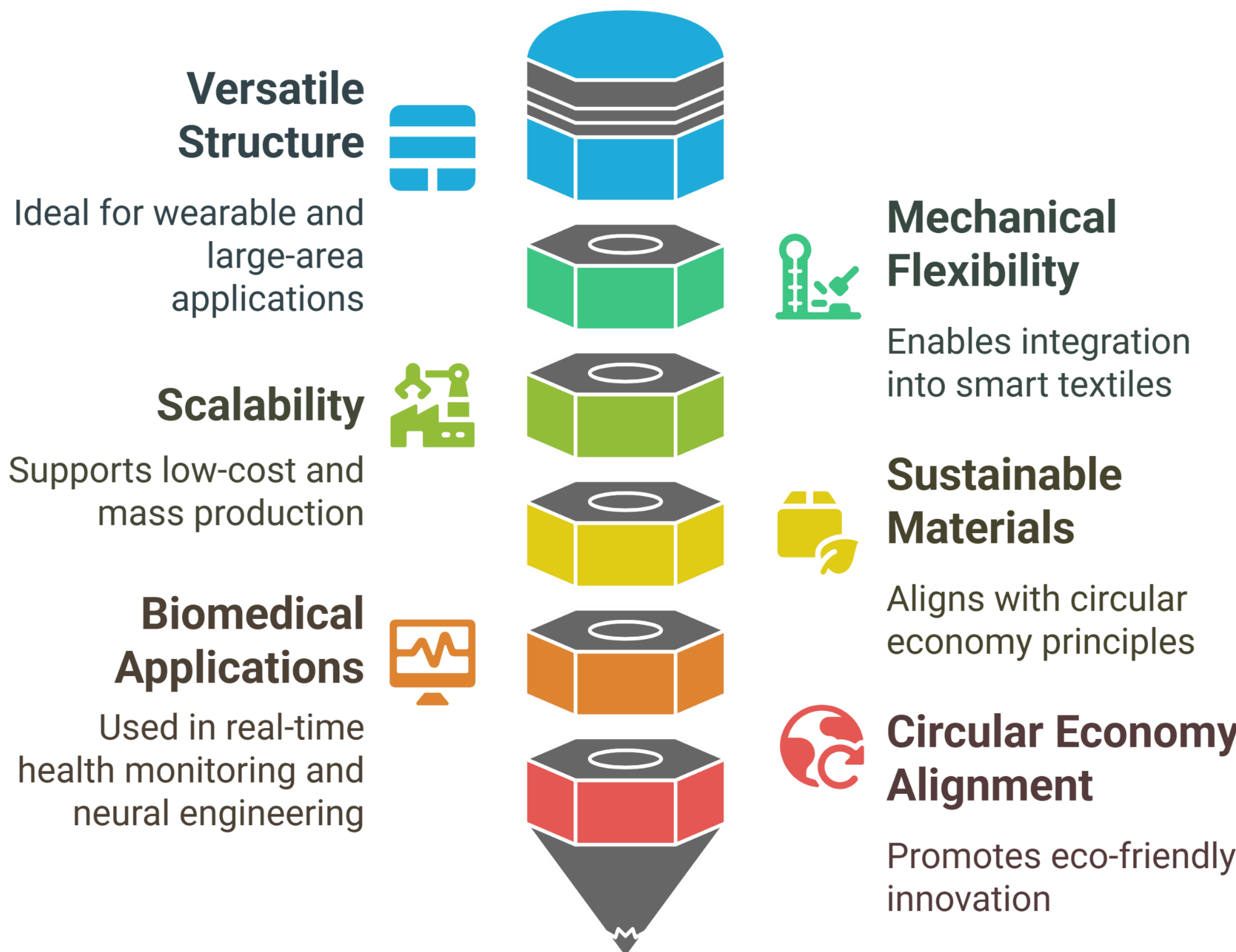
SCIENTIFIC BREAKTHROUGH

- ❑ First demonstration of memristor behavior in PET-metal composite fiber-based e-textile.
- ❑ Write-Once-Read-Many (WORM) memristor effect observed due to changes in the crystallinity of the phase-change material.
- ❑ Two or more distinct conduction states are achieved within a single two-terminal device.

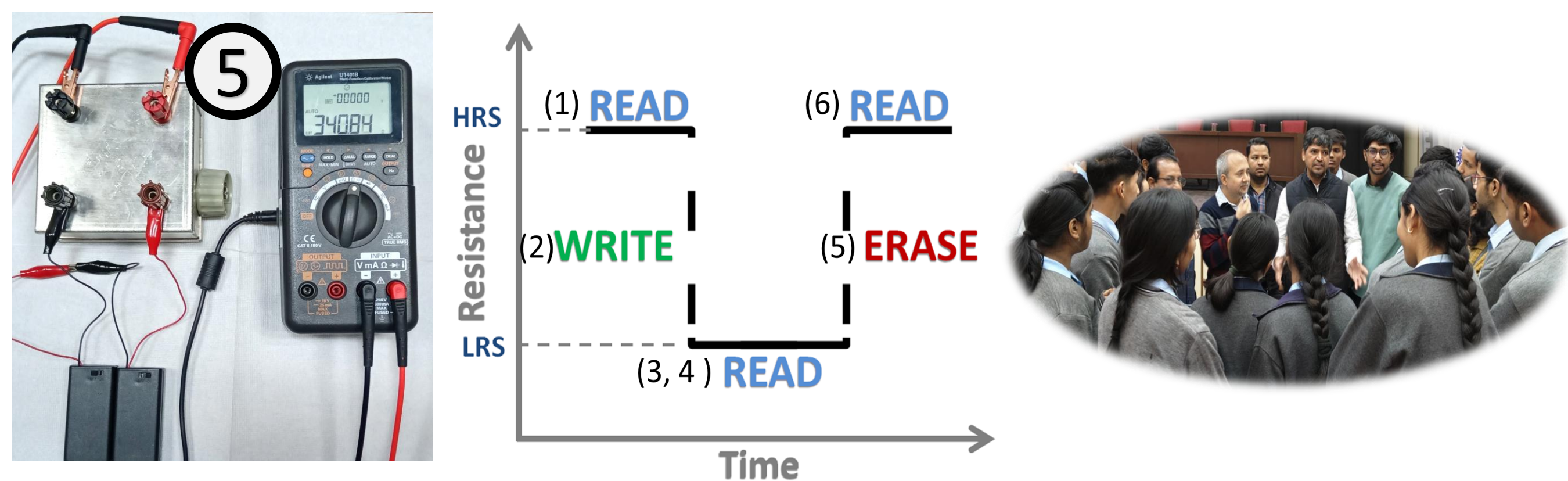
CHALLENGES FOR METROLOGISTS



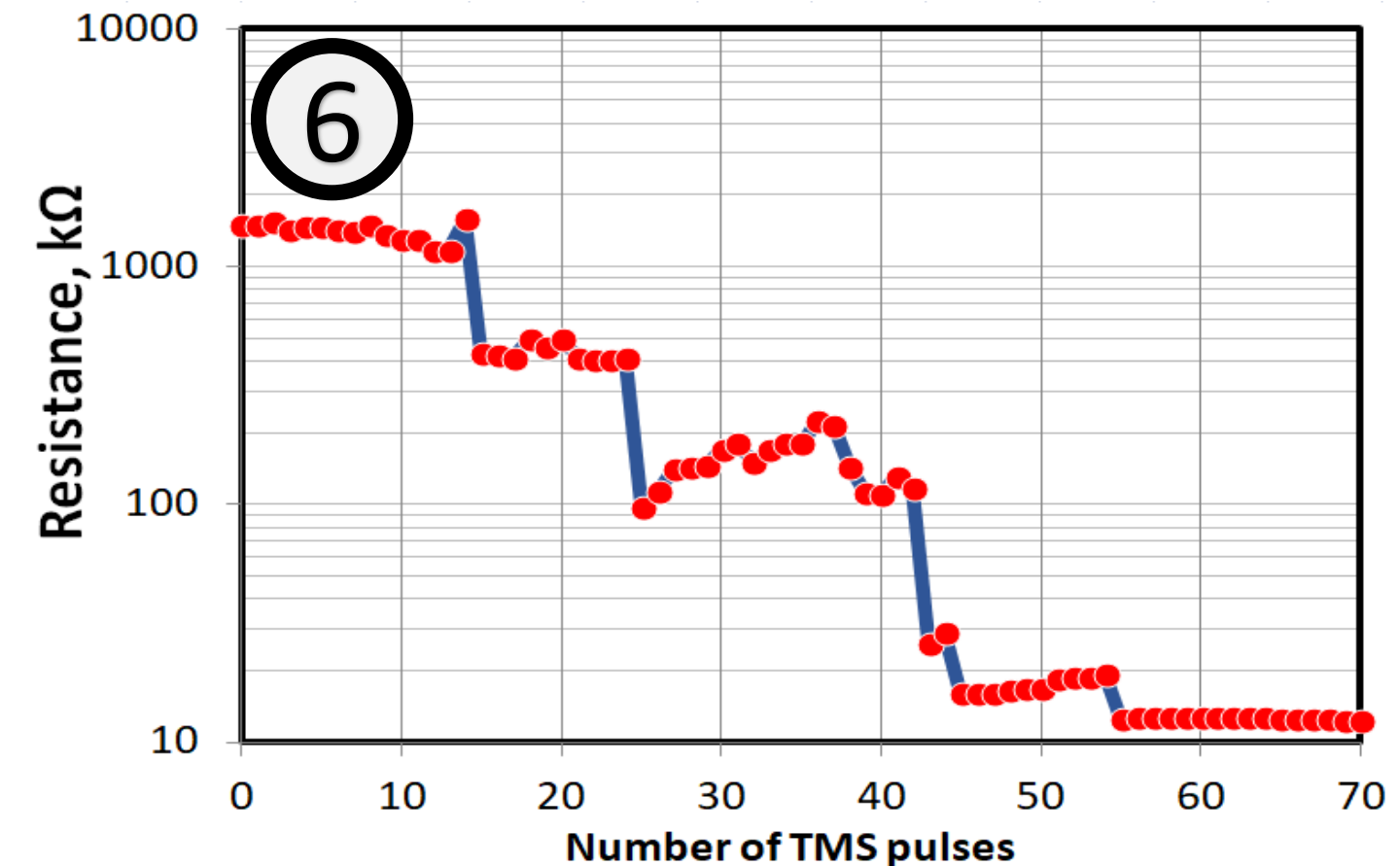
APPLICATIONS AND FUTURE IMPACT



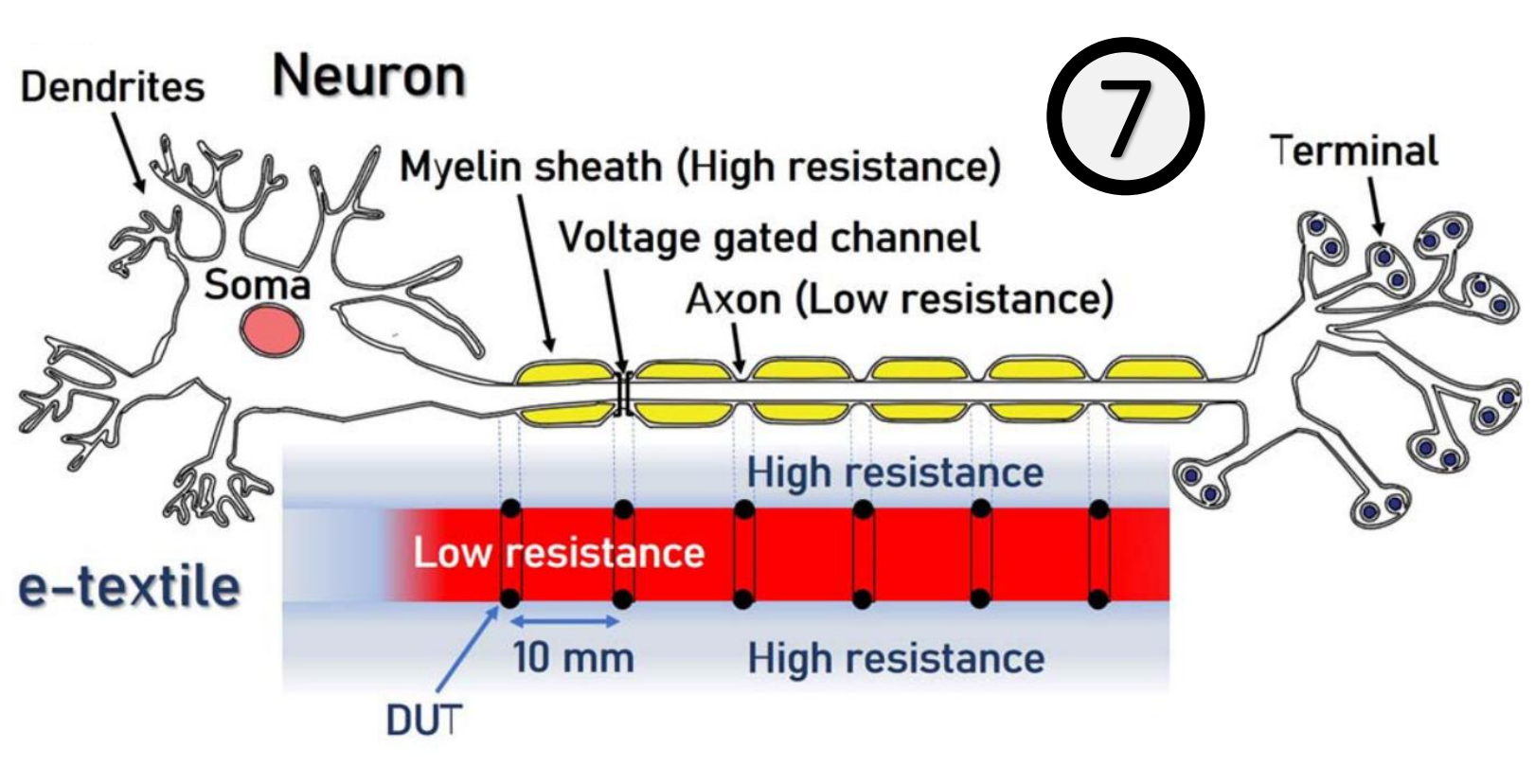
MEMRISTOR KIT FOR STEM EDUCATION



SYNAPTIC INTEGRATE AND FIRE



BIO-MIMICKING



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