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Coastal bridge infrastructure: energy-harvesting and sensing capabilities through magnetic structured triboelectric nanogenerators

Ali MATIN NAZAR, Arash RAYEGANI, Maria RASHIDI, Fatemeh RAHIMI SARDO

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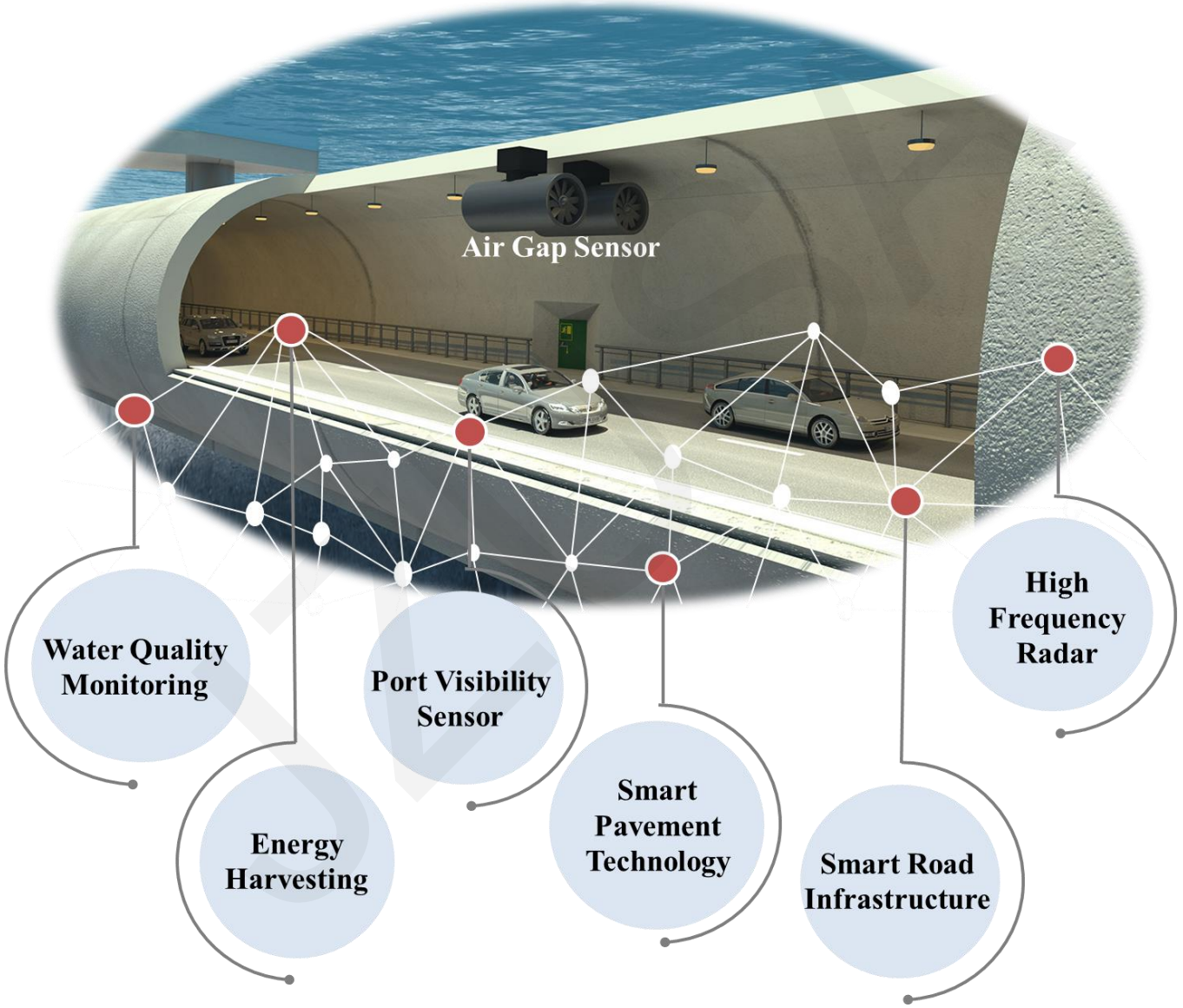
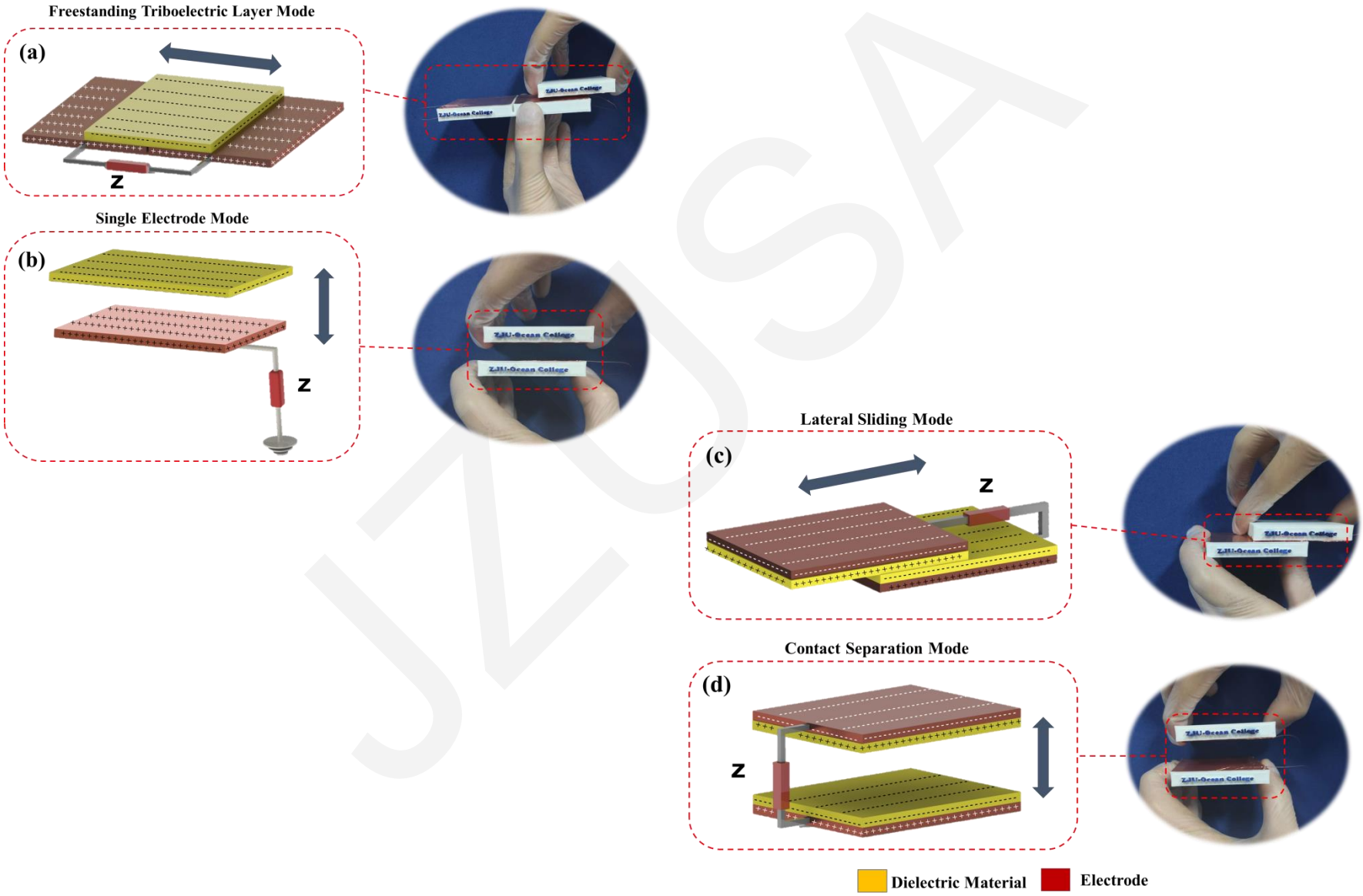
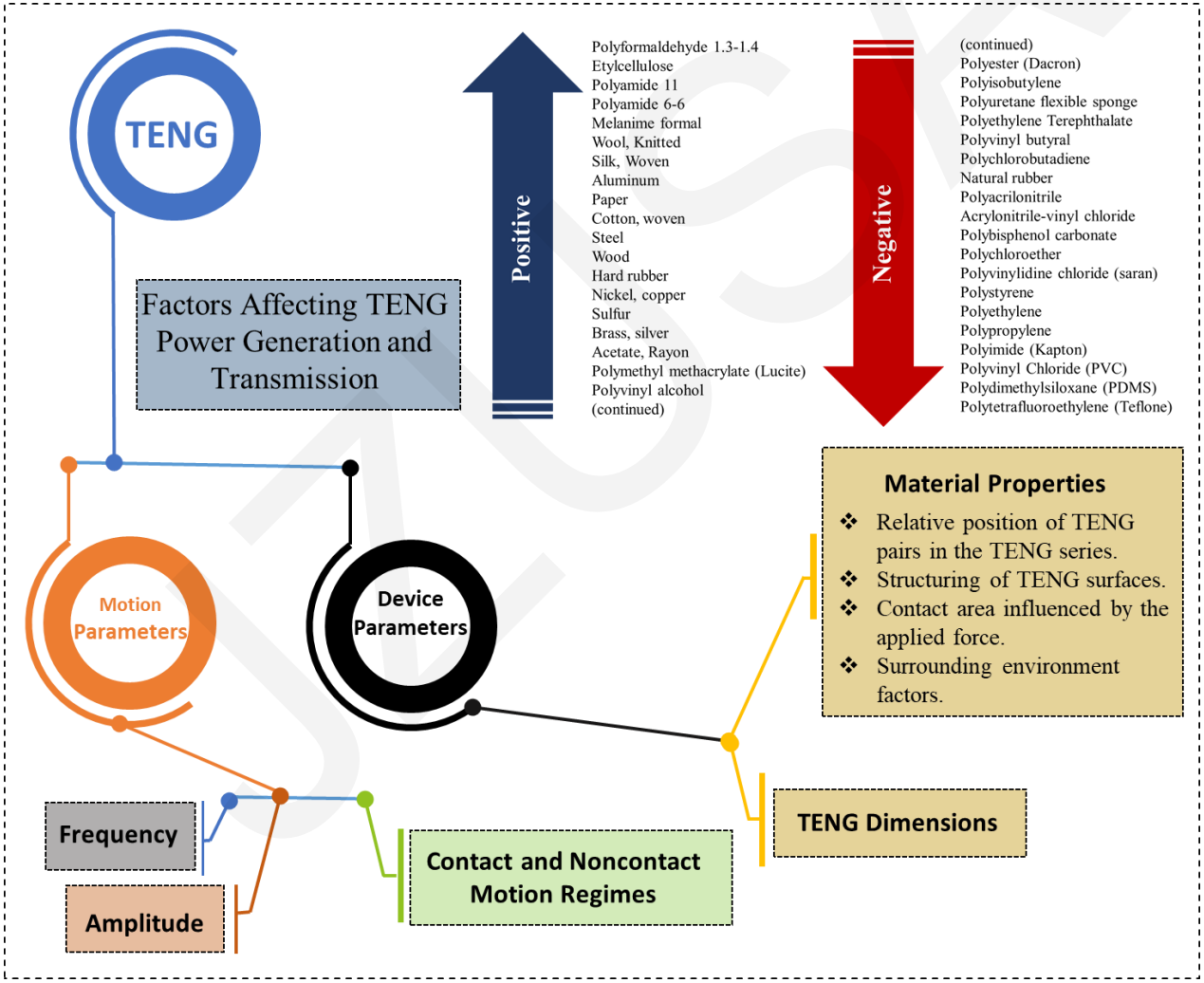
Intelligent coastal infrastructure



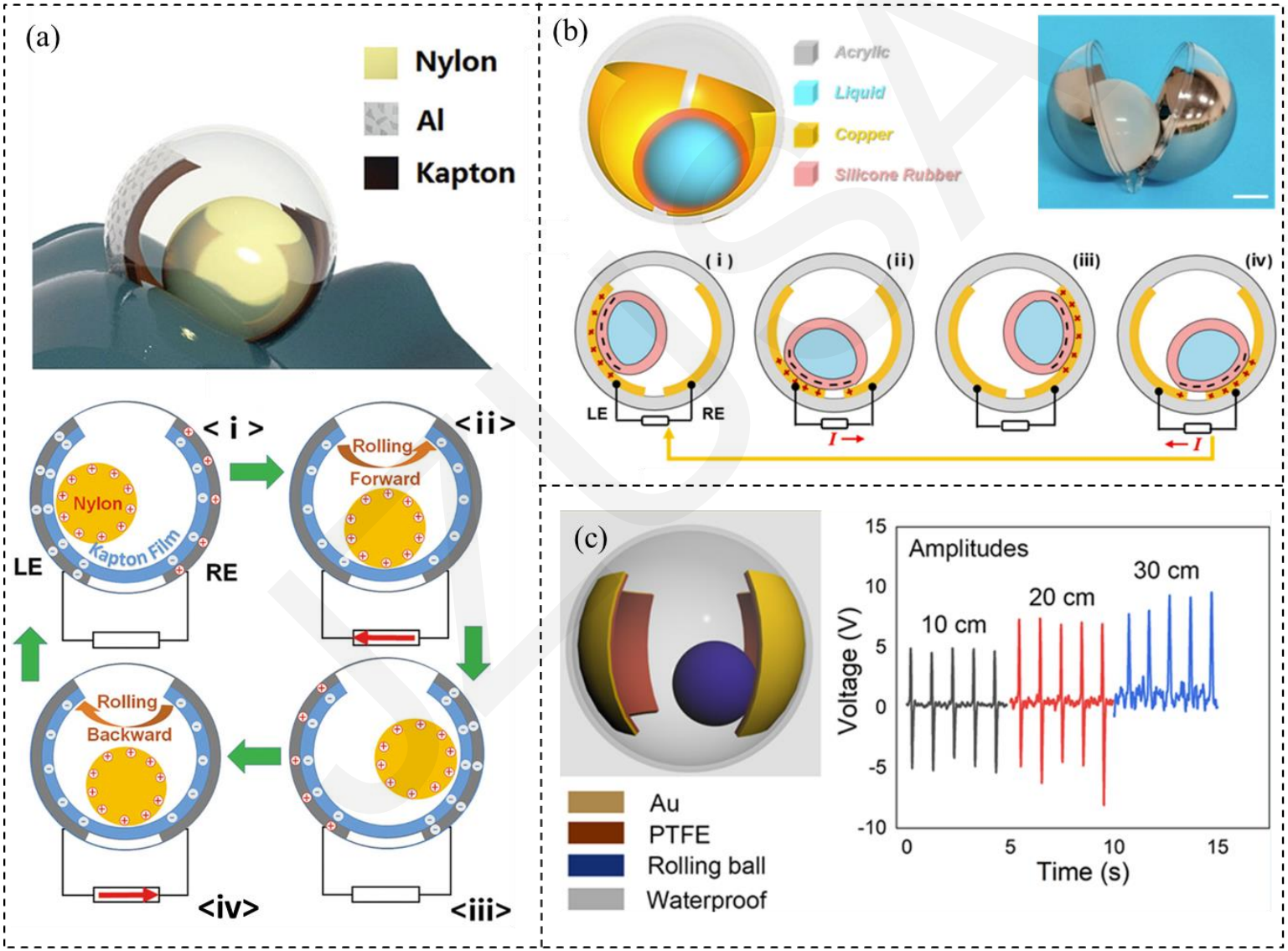
Four modes of triboelectric nanogenerators



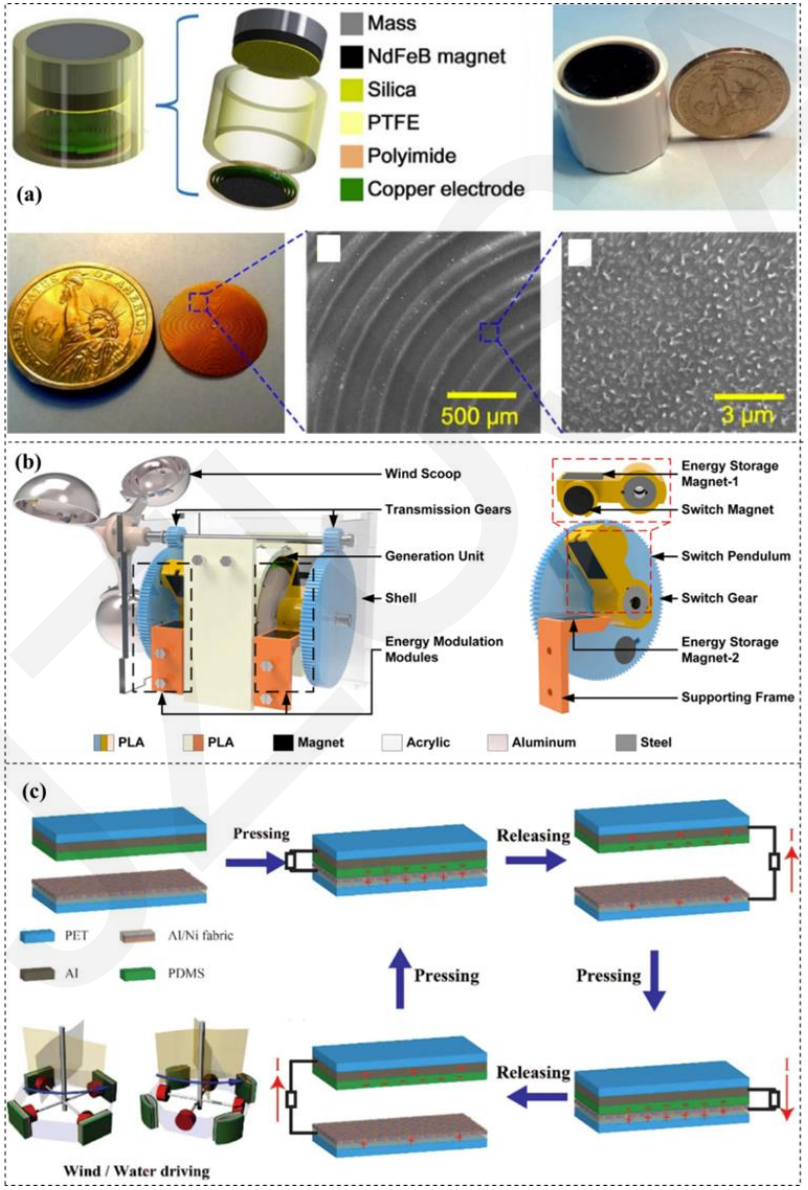
Triboelectric series and Factors affecting TENG power generation and transmission



Magnetic Spherical Triboelectric Nanogenerator Networks



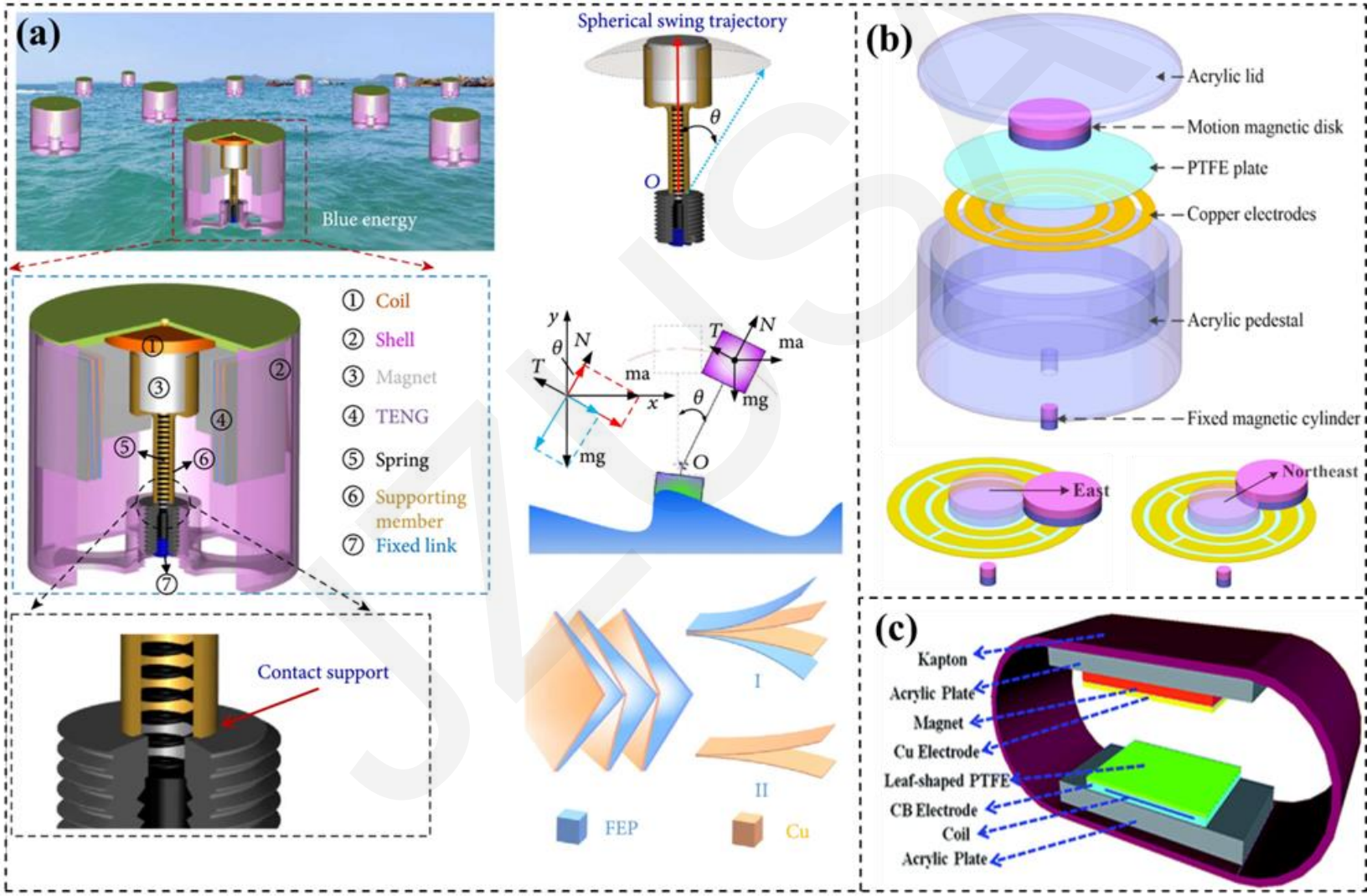
Magnet-Assisted Triboelectric Nanogenerator



Magnetic Structured Triboelectric Nanogenerators for bridge



Magnetic Multilayer structure based on the Triboelectric Nanogenerators



Assessing Magnetic Structured TENGs in Comparison to Conventional TENGs



Conclusions

In conclusion, magnetic structured triboelectric nanogenerators (MSTNGs) have emerged as a promising technology for energy harvesting and sensing in coastal bridge infrastructure. This paper reviews recent advancements, covering fundamental physics and various types of MSTNGs, including magnetic spherical TENG networks, magnet-assisted TENGs, and magnetic multilayer structures. Significant progress has been made in optimizing these devices, but challenges remain in improving their durability, sustainability, and power output in harsh coastal environments. Collaboration between academia, industry, and government is essential for future advancements in MSTNG design and application.

