

Perspective: Way of Sustainable Manufacturing for Disposable Quantum Spin Biosensors and Sticker-Like 2-Qubit Quantum Computers

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After the invention of Intel's 4-bit processor, the Intel 4004, there has been an unprecedented rise in silicon chips that has contributed to global warming, overwhelming heavy industries. Therefore, when innovative technologies are developed, it is crucial to consider environmentally friendly manufacturing methods to sustain the Earth. In this presentation, a sustainable manufacturing method will be introduced for fabricating a disposable quantum spin-based biosensor (QS-Bs) and a sticker-like quantum computer with 2 qubits (2-Qt SQC). To produce both QS-Bs and 2-Qt SQC without emitting hazardous byproducts, a typical additive manufacturing method using printing technology will be optimal, provided that a spin probe material with a long coherence time under ambient conditions can be formulated into an ink. Accordingly, a 1-D spin probe material (single-walled carbon nanotube: SWCNT)-based ink will be introduced and characterized by EPR spectroscopy, and a method for printing QS-Bs and 2-Qt SQC will be presented to demonstrate how the printed QS-Bs can monitor a single molecule in biofluid in real time and how the printed 2-Qt SQC operates.

References

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