

Natural MEMS, glassy rubberbands and self-healing adhesives – a glance at diatoms, and what they can teach us

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Diatoms are single celled algae that have been evolutionarily optimized for the last 50 million years or more.

Via biomineralization, they build delicate naturally nanostructured silica shells. In many diatoms, hinges and interlocking devices on the micrometer scale and below serve as inter- and intracell connections. *Ellerbeckia arenaria* is a diatom that lives in waterfalls. Cell colonies of this species can be elongated by about 1/3 of their original length, their silica shells will not break, and they snap back like a rubberband. The strong biogenic adhesive certain diatoms use to attach to surfaces reveals self-healing multi-modal properties on the single molecule level.

Regarding diatoms as model systems yields valuable input for novel emerging technologies such as MEMS and adhesive technologies.

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