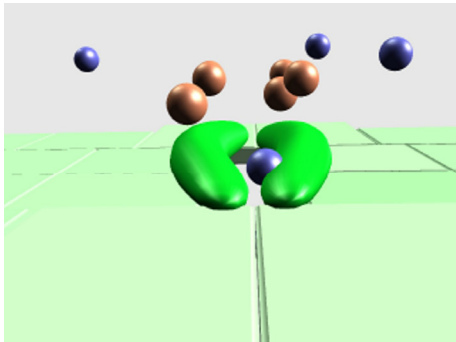

Self-regulation: smart botanical valves

Plants are equipped with various structures which act as self-regulating valves. These structures continuously change the permeability of plant surfaces for gases or liquids, according to instantaneous demands. By devising suitable concepts, it should be possible to transfer these smart functional principles from Nature into technical devices.



Plants interact with water in various ways. One prominent and important example is the continuous adaptation of the evaporation rate of leaves via regulation of micropores (stomata). Another example is represented by the absorptive scales of Bromeliad leaves. Atmospheric water is absorbed by these structures which seal the leaf surface under dry conditions.



Materials which are able to adapt their permeability for gases and liquids analogous to plant valves would be attractive for many technical applications. First prototypes demonstrate that suitable transfer principles can be identified.

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