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(54) **SELF-ASSEMBLED MONOLAYER BASED SILVER SWITCHES**

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(57) **ABSTRACT**

The present invention is a two-state switching device based on two electrodes separated by a self-assembled monolayer. At least one of the electrodes may be composed of silver and the other electrode of any electrically conductive material, such as metals, especially gold or platinum. In the high-resistance OFF state, the two electrodes are separated by an non-electrically conducting organic monolayer. Application of a negative threshold bias causes a silver ion filament to grown within the monolayer and bridge the gap between the two electrodes, changing the device into a low-resistance ON state. The device may be turned OFF by application of a positive threshold bias, which causes the ionic filament to retract back into the silver electrode. The device is easy to fabricate, smaller than currently available devices, and because the only required components are silver, another electrode and a self-assembled monolayer between them, it should be possible to incorporate this switch into a variety of device geometries.