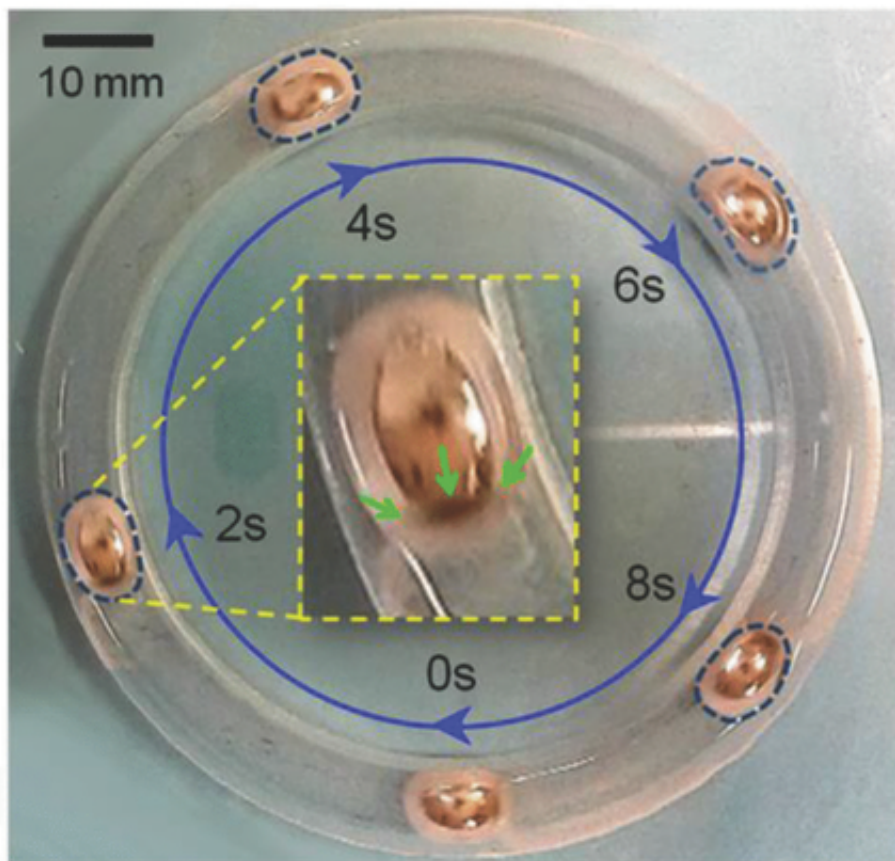


Shape shifting liquid metal able to propel itself through liquids (w/ video)

March 11 2015, by Bob Yirka



(Phys.org)—A team of researchers at Tsinghua University in China has, according to a report in *Newscientist*, found a way to mimic, if only in a small way, the shape shifting robot in the Terminator movies. The team

has published their findings in the journal *Advanced Materials*.

As part of an effort to better understand the properties of liquid metals, the researchers were working with gallium—after adding a little bit of indium and tin they discovered that if a bit of aluminum was affixed to a single [drop](#) of the alloy (to serve as fuel) and the result was dropped into a container of [sodium hydroxide](#) (or even [salt water](#)) the drop would propel itself around the container for approximately one hour. In subsequent tests they found that if the container was shaped with channels, the drop could be made to follow a pre-designated path. What's more, they noted that if the drop encountered a part of the channel that was slimmer than it was, it could squeeze through.

Surprised by the movement of the drop, the researchers took a closer look—analysis revealed that when the drop was placed in the solution, a charge imbalance occurred between the front and back of the drop, causing a pressure differential. They also found that as the aluminum reacted with the saltwater, [tiny bubbles](#) were formed which also served to push the drop forward (so long as the aluminum bit was on the back end.)

The experiments by the team build on prior work by them and others (as part of an effort to make "soft" robots) that showed that with some [liquid metals](#), an electric charge can cause both an expansion and change of shape to a drop. The researchers note that if both techniques were used, the result could be drops that not only move themselves through liquids, but change shape according to predetermined needs. They suggest their findings could conceivably pave the way for drops that are used to deliver materials via pipes or even through blood vessels.

Interestingly, the [researchers](#) also noted that if the drop were forced to remain in place in the solution it would cause the liquid around it to move, in essence serving as a pump.

More information: Self-Fueled Biomimetic Liquid Metal Mollusk, *Advanced Materials*, Article first published online: 3 MAR 2015.
DOI: 10.1002/adma.201405438

Abstract

A liquid metal motor that can "eat" aluminum food and then move spontaneously and swiftly in various solution configurations and structured channels for more than 1 h is discovered. Such biomimetic mollusk is highly shape self-adaptive by closely conforming to the geometrical space it voyages in. The first ever self-fueled pump is illustrated as one of its typical practical utilizations.

via [Newscientist](#)

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