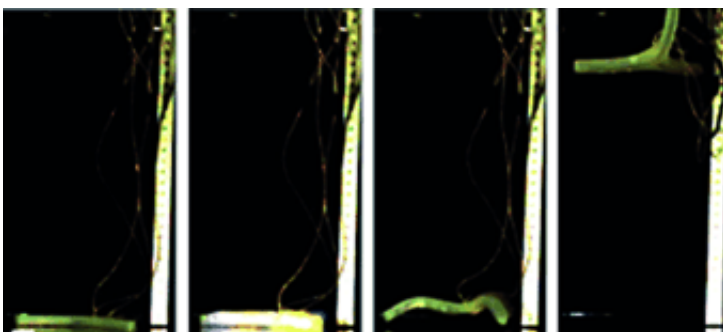


Tiny robot made to jump by causing explosions inside its body (w/ video)

February 8 2013, by Bob Yirka



Credit: Wiley

(Phys.org)—Researchers at Harvard University have begun testing a new way to get robots to jump higher. Instead of building stronger legs, or using compressed air, they are imbedding tubes in its legs that when filled with methane and oxygen and ignited, cause an explosion that propels the robot into the air. Using this technique, the researchers have managed to get a small rubbery, three legged robot to "jump" more than 30 times its own height. They report their results in a paper they've had published in *Angewandte Chemie*.

In the quest to build robots with ever greater capabilities, researchers in the past couple of years have turned away from hard shelled programmable machines, to designs based on [soft materials](#)—they're generally lighter and more amendable to changes in the environment. To that end, George Whitesides and colleagues at Harvard have been

creating robots made out of rubbery [silicone](#) and then testing them to see what they can be made to do. In this latest test, the researchers built a three legged robot, that isn't really able to do anything except jump. It's connected via tubes to a base that delivers the [gasses](#) and of course the spark that sets it off.

The trick, the researchers note, is to get the robot to jump in a way that is useful. In this case, it means in a way that keeps the robot reasonably level so that it can land on its feet. That requires fine tuning the amount of gas delivered to the tubes embedded in its legs. Explosions, they say, rather than blasts of air, or the releasing of springs, allows for a much more forceful jump. So well have their experiments gone so far that they say their little robots are now only constrained by the tubes that connect them. Important also is determining if the robot body can withstand the blast, and thus far, the team says, it's come through with flying colors.

Robots that can jump are expected to be useful for search and [rescue operations](#). To be able to do so over large objects without damaging themselves in the process is seen as the ultimate goal. Up next for the team is to determine if a means can be found to allow for steering the robots in mid-jump, allowing for more precision in reaching landing spots.

More information: Using Explosions to Power a Soft Robot, *Angewandte Chemie*, DOI: 10.1002/ange.201209540

Abstract

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