

# Dartmouth researchers create new nano switch

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(PhysOrg.com) -- Dartmouth researcher Ivan Aprahamian and his team have developed a new molecular switch that changes its configuration as a function of the pH of the environment. This discovery might someday help lead to targeted drug delivery systems, molecular-level data storage, and molecular electronics - all important objectives in nanotechnology.

In nanotechnology, mastering the machinery of [chemical bonds](#) is tricky business - and the fact that they are tiny, at the molecular level, is just one hurdle. Dartmouth researcher Ivan Aprahamian and his team have developed a new molecular switch that changes its configuration as a function of the pH of the environment.

This discovery, using [synthetic materials](#), mimics natural, biological molecular motors such as the F1-ATPase. This might someday help lead to targeted drug delivery systems, molecular-level [data storage](#), and molecular electronics, important objectives in nanotechnology.

The study appeared in December online issue of the [Journal of the American Chemical Society](#).

“The switching process takes place via a rotation around the carbon-nitrogen double bond, and it turns out that our system is the first chemically activated rotary switch that relies on rotation around a double bond as opposed to rotation around a single bond,” said Aprahamian, an assistant professor of chemistry, who explains that rotation around a single bond yields multiple conformations, whereas rotation around a

double bond affords two configurations.

“Light-induced configurational switches are known and have been used in various applications. Ours is chemically driven, similar to biological motors, which can lead to new possibilities in [nanotechnology](#)”.

Aprahamian’s co-author on the paper is Shainaz Landge, a post-doctoral researcher at Dartmouth.

**More information:** Journal: [pubs.acs.org/journal/jacsat](https://pubs.acs.org/journal/jacsat)

Provided by Dartmouth College

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