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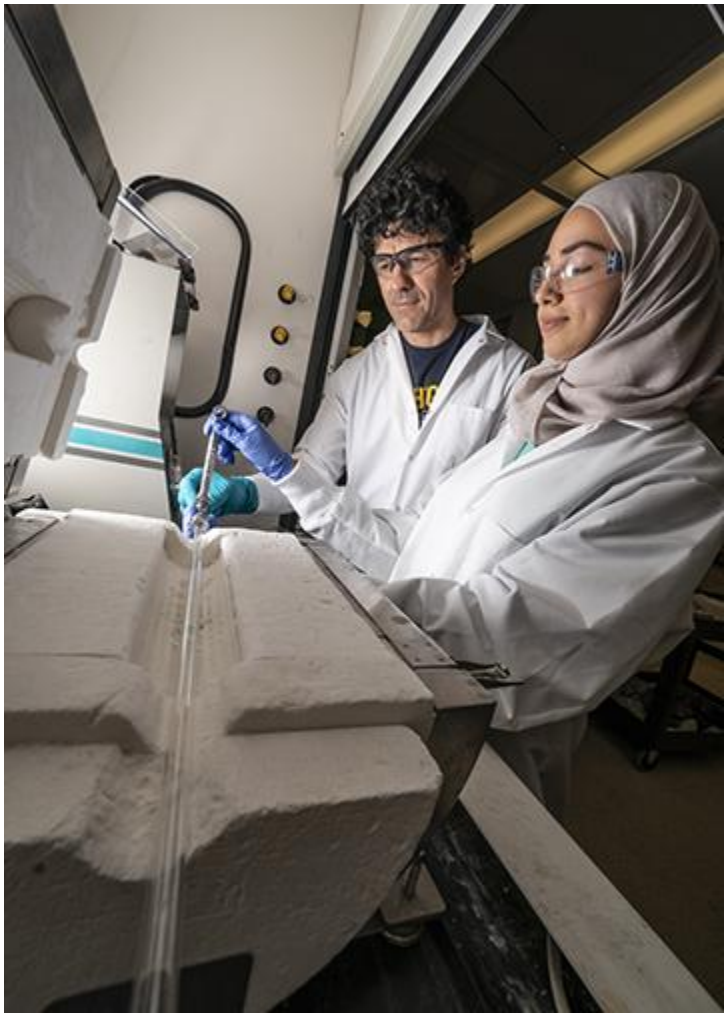
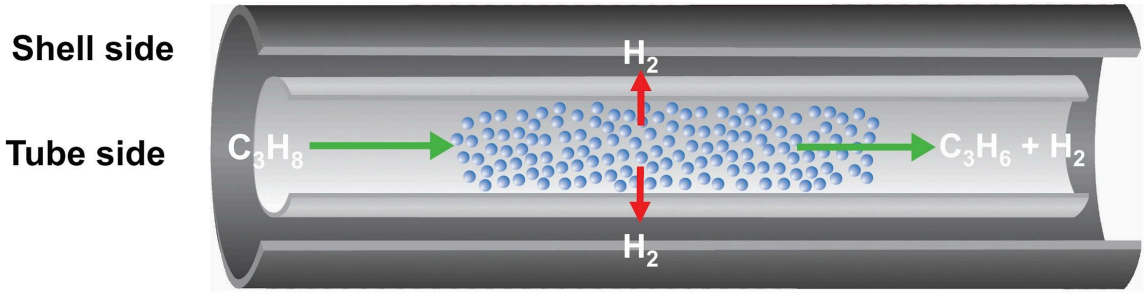
Captions: New reactor could save millions when making ingredients for plastic and carpets from natural gas



Linic-lab.jpg: Rawan Almallahi, a doctoral graduate of chemical engineering and the study's first author, is preparing a reactor for a performance test inside a furnace. Suljo Linic, the Martin Lewis Perl Collegiate Professor of Chemical Engineering and the study's corresponding author, assists Almallahi. Photo credit: Sandra Swisher, Department of Chemical Engineering, University of Michigan.

Alt text: Two scientists stand in front of a furnace that is sitting on a lab bench. The furnace looks like a metal box and the top half is opened by a hinged door. Inside the

furnace is white ceramic material. The reactor, which resembles a glass tube, sits inside a channel carved into the ceramic.



membrane diagram.jpg: The innermost tube of the reactor splits propane into hydrogen gas and propylene and allows the hydrogen gas to escape into the outermost shell of the reactor. That hydrogen gas can be burned to further drive the reactions. Image credit: James Wortman, Linic Lab, University of Michigan.

Alt text: The reactor resembles a nested pair of tubes. Propane (C_3H_8) from shale gas flows through the innermost tube. A green arrow shows how the gas particles flow along the tube, splitting into propylene (C_3H_6) and hydrogen gas (H_2) in the process. As the hydrogen gas is produced, red arrows show that it can flow through the wall of the inner tube into the outer tube.

All images