

Abstract Submitted  
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**Oil-water separation using synthetic trees**<sup>1</sup> VIVERJITA UMASHANKAR, Virginia Tech, ARUN KOTA, Colorado State University, JONATHAN BOREYKO, Virginia Tech — In the world's tallest trees, water evaporating from leaves generates enough suction to lift water over 100 m high. Transpiration can similarly be attained in synthetic trees by coupling nanoporous “leaves” with conduits mimicking xylem capillaries. Here, we demonstrate that by adding filters to the free ends of the xylem conduits, the hydraulic load generated by transpiration can be used for oil-water separation. Our synthetic tree was comprised of a vertical array of glass tubes of millimetric diameter, whose upper ends were embedded within a nanoporous ceramic disk and whose lower ends were attached to pre-wet cellulose acetate membranes supported by stainless-steel meshes. After saturating the synthetic tree with degassed water, its synthetic roots (filters) were submerged in a reservoir containing a hexadecane-in-water emulsion. The separation efficiency of liquid entering into the tree was quantified by density and contact angle measurements of permeate extracted from the glass tubes.

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