

Abstract Submitted
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Analysis of Porous Media as Inlet Concept for Rotating Detonation Engines¹ KEVIN GROGAN, MATTHIAS IHME, Stanford University, DEPARTMENT OF MECHANICAL ENGINEERING TEAM — Rotating detonation engines combust reactive gas mixtures with a high-speed, annularly-propagating detonation wave, which provides many advantages including a stagnation pressure gain and a compact, lightweight design. However, the optimal design of the inlet to the combustion chamber inlet is a moot topic since improper design can significantly reduce detonability and increase pressure losses. The highly diffusive properties of porous media could make it an ideal material to prevent the flashback of the detonation wave and therefore, allow the inlet gas to be premixed. Motivated by this potential, this work employs simulation to evaluate the application of porous media to the inlet of a rotating detonation engine as a novel means to stabilize a detonation wave while reducing the pressure losses incurred by non-ideal mixing strategies.

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