

Abstract Submitted  
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**The interaction of pulsatile flow in the presence of wall waviness with application to separation in space habitation environments** AARON THOMAS, GATWECH THICH, DEMIAN GUTHMILLER, University of Idaho, RANGA NARAYANAN, University of Florida — Oscillatory flows in tubes are a novel way to increase the separation of two dilute species present in a carrier while providing a high throughput or mass transfer. We can then mechanically separate, for example, trace contaminants from air in long-term manned space missions without a re-supply or a regeneration of materials. The separation is connected to dispersion wherein low diffusing species is axially dispersed down a tube to a great amount than a fast diffusing species. One of the ways to change the rate at which a species transports is to alter the flow by modifying the geometrical configuration of the tube. This study analyzes the effect of a wavy-walled boundary on the mass transfer and separation of two dilute species. The main goal is to understand the physics so that a system can be designed to give the greatest separation along with a high mass transfer. The results show that the wavy-wall decreases the overall mass transfer as oscillation frequencies increase in comparison to a flat wall but increases the separation.

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