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# C3Or3C-04: A Novel 3D Printed Regenerator Filler for Large Stirling and Pulse-Tube Cryocoolers

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Large cryocoolers are needed for future In-Situ Resource Utilization (ISRU)-based production of cryogenic fuel material. This paper reports on the design and preliminary testing and simulation of a novel regenerator filler for Stirling and pulse-tube cryocoolers with 150W cooling power at 90K temperature. The regenerator is loaded with 3D printed 1 cm-thick ceramic disks that have flow features that are 75 μm wide. Each ceramic disk comprises 36 wedges. The disks are stacked to fill the regenerator. The disks are separated from each other by 200 μm-deep gaps to avoid flow blockage caused by misalignment among adjacent disks. Experimental data and CFD simulations addressing the flow and pressure drop in the stacks are presented and discussed.

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