

N2 Continuous Sublimation Cooler

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The drawbacks of low-temperature cryogenics such as the explosivity of Hydrogen and the dwindling supply of Helium make vaporization/condensation-based cryocoolers with operating temperatures below the boiling point of Nitrogen at 77 Kelvin expensive or inaccessible for many uses. Aside from its high boiling point, Nitrogen is an ideal choice for cryogenics: it is cheap, present everywhere, and inert. To capitalize on this, previous cryogenic systems have experimented with batch-solidifying Nitrogen for brief cooling below 77 Kelvin. However, little work has been done on continuous solidification-based cooling using Nitrogen. In this work we introduce a design for a continuous N₂ sublimation-based cryocooling system capable of reaching and maintaining temperatures below the triple point of Nitrogen at 63 Kelvin.