

Results of the investigation of a mixed refrigerant cryocooler

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In recent years mixed refrigerant cycles (MRC) have found increasing interest for applications in the field of cryocoolers. Being already proven since decades in large scale industrial application such as baseload natural gas liquefaction MRCs offer advantages over Gifford McMahon and Stirling cycles used hitherto as small cryocoolers. This is mainly due to the fact that MRCs possess no moving parts in the cold section which can lead to detrimental vibrations at the cold head. Moreover, MRCs have the potential of achieving about the same efficiencies as other competing cryocoolers such as pulse tube coolers with the advantage of low cost.

At our institute a mixed refrigerant cryocooler test stand has been erected and experiments run with different mixtures. Lowest temperatures ranging from abt. 65 K to 150 K were preset. The performances of two counter current heat exchangers were compared. At the low range of temperatures Carnot efficiencies comparable or superior to those published in the literature have been achieved. The results will be presented and the operation experience of the test cycle will be discussed.