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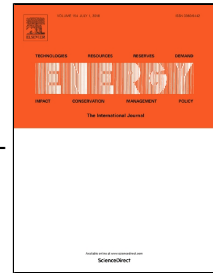
Experimental research on the pull-down performance of an ejector enhanced auto-cascade refrigeration system for low-temperature freezer

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1 **Experimental research on the pull-down performance of**
2 **an ejector enhanced auto-cascade refrigeration system**
3 **for low-temperature freezer**

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7 **Abstract**

8 This paper presents an experimental investigation on pull-down performance of
9 an ejector enhanced auto-cascade refrigeration cycle for low-temperature freezer
10 application. The pull-down performances of the freezer established on the ejector
11 enhanced cycle and conventional auto-cascade refrigeration cycle were compared.
12 Additionally, operation behaviors of the ejector and the new cycle based freezer at
13 different mixture concentrations and throttle valve openings were investigated. The
14 results indicated that ejector enhanced system exhibited shorter pull-down time and
15 lower freezer air temperature after continuous operation in comparison with the
16 conventional system. And the pull-down time was saved by 34.4% and the energy
17 consumption of the compressor was reduced by 29.6% at the desired freezing
18 temperature of $-40\text{ }^{\circ}\text{C}$. The largest time average values of the pressure lift ratio and
19 entrainment ratio reached up to 2.854 and 1.340, and the time average compression
20 ratio of the compressor was reduced by 11.6% due to the effective pressure lifting
21 effect of the ejector. The optimal mass fraction ratio of 30%/70% for the mixture

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