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Coefficient of performance at maximum χ -criterion of thermochemical refrigerators with near-independent particles

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Highlight:

1. A kind of thermochemical refrigerator is proposed in theory with Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein near-independent particles.
2. Expressions of coefficient of performance and cooling rate of the refrigerators are derived.
3. A region of coefficient of performances at maximum χ figure of merit is found after introducing an energy filter with width.
4. The upper bound of Bose-Einstein system can be approximated by the Curzon-Ahlborn COP:

$$\varepsilon_{CA} = \sqrt{1 + \varepsilon_C} - 1.$$

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