Thermoacoustic cooling with no refrigerant

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Abstrak

The Brundtland Report (also known as Our Common Future) has placed sustainability of energy resources and environmental degradation on a common global agenda. Increasing awareness has spurred much research into alternative clean energy technologies. Thermoacoustic cooling as an environmentally friendly refrigeration system is one of the research areas being pursued. Although not commercially available, successful systems have been completed. There are, however, still many fundamental issues related to the thermoacoustic effects and the associated heat transfer that must be addressed. This paper reports a portable counter-top thermoacoustic cooling apparatus designed and fabricated at the Universiti Teknologi Malaysia (UTM). Based on a standing wave resonator tube, the system with a pvc resonator tube of 60 mm diameter which was initially at 24o C, accomplished cooling effects under a minute, up to 18.5o C, without the use of chlrofluorocarbons (CFCs) or other similar refrigerants which have been known to be hazardaous to our living environment. Another acrylic 110 mm diameter tube once recorded 8o C with the ambient held at 23o C. The cooling in the first system was repeatable but not significant enough for practical applications. However, with no refrigerants used and its relatively simple manufacturing, a thermoacoustic cooling system is a potentially clean cooling system to be further investigated for practical or specific applications.