

水/1, 4-Dioxane 溶液の溶解機構に関する研究 二成分系共沸液による低沸点熱媒体の研究 (1 報)

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A study on the Solution Mechanism of H₂O/1, 4-Dioxane Azeotropic Mixture Research of a Thermal Working Substance with a Lower Boiling Point on the Base of an Azeotropic Mixture Composite of Two Constituents (1st. report)

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Abstract

The authors have made a research and development of a thermal working substance, which has a boiling point of around 358 K under normal pressure, for one of effective technologies contributing to an environment protection of the earth and a stabilized procurement of energy resources.

If succeeded, the technology could make it possible to come true high efficient and economical utilization of such low grade thermal energy as a factory waste heat and a solar heat below 373K in temperature.

For the purpose, the azeotropic mixture of H₂O/1, 4-Dioxane has been selected a prospective thermal working substance from many azeotropic mixtures which make their boiling points lower than those of their constituents themselves.

In the report, a solution mechanism of the mixture was studied by measurement of its densities and spectrum analyses of its dynamic structure with ¹⁷O-NMR under changing mixture mol ratio from 0 to 1.

The work has resulted to obtain some technical knowledge as follows, which are necessary to put the working substance into practical use.

1) H₂O/1, 4-Dioxane azeotropic mixture has very suitable properties and dynamic structure of solution for a thermal working substance.

2) The constituents solve in hydration and then the mixture takes three different types of solution mechanism for three ranges of mixture mol ratio which are the ratio of 0.825 itself, over and below than it.

1. 緒 言

地球環境の保護、エネルギー資源の確保等世

界が当面する課題の対応策の1つとして温度100°C程度以下の各種工場排熱や太陽熱等の低品位熱エネルギーを高効率・経済的に利用する技術の研究開発が強く求められている。

しかし、このようなニーズに対応できるのは、現在では熱媒体にフロンを使用する技術である。

平成7年10月16日受理

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