

Estimation of the useful life of working substances at given temperature

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Aliphatic alcohols and their aqueous mixtures in different states are good working mediums (solvents, heat carriers) in technological processes of chemical, pharmaceutical and energy industries [1]. For optimization of technological processes one needs to know all thermo-physical properties of certain substances, including thermal stability i.e., ability of substance to maintain their chemical composition and end-use properties in all range of working temperatures [2]. Among all the above-listed properties of working substances or heat-carriers only one work [3] mentioned the useful life property (time during which the heat carrier decomposes by no more than 10 percent). By using our own experimental data on thermal stability [4] and the formula of the authors [3] the useful life of the pure aliphatic alcohols and their aqueous solutions ($x=0.2, 0.5, 0.8$ mole fractions of alcohol) were estimated.

- [1] Vukalovich M P, Babikov Y M and Raskazov D 1970 *Thermophysical Properties of Organic Heat-Carriers* (Moscow: Atomizdat)
- [2] Babikov Y M and Raskazov D 1985 *Organic and Silicone Heat-Carriers* (Moscow: Energoatomizdat)
- [3] Blake E S, Hamma W C, Edwards J W, Reichard T E and Ort M 1961 *Journal of Chemical and Engineering Data* **6** 87–98
- [4] Dzhapparov T A and Bazaev A R 2012 *Journal of Materials Science and Engineering* **12** 793–798