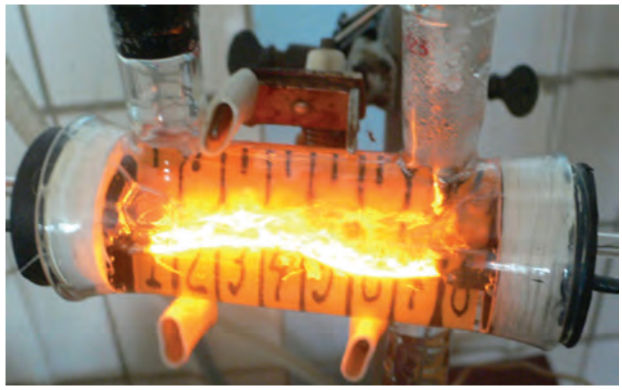
NANOFLUIDS FOR EFFICIENT HEAT EXCHANGE SYSTEMS OF POWER ENGINEERING, TRANSPORT, AND INDUSTRY

Nanofluids based on aluminum silicates (left) and carbon nanotubes (right)



Trial vessel. Boiling nanofluid

Areas of Application

The nanofluids are colloidal dispersions of nanoparticles having different nature and chemical composition in conventional heat-transfer agents. Today, the nanofluids are promising heat carriers to be used in nuclear industry, power engineering, electronics, metallurgy, laser transmitters, power transformers etc.

Specification

Average particle size, nm	70 – 3000
Concentration of particles, wt %	0.5 – 1.0
Sedimentation stability, months	1.5 – 2.0
Critical heat flux, $q \cdot 10^{-6}$, W/m^2	3.5 – 3.8
Heat exchange coefficient, α, W/m^2K	35 000 – 52 000

Advantages

The nanofluids can increase the critical heat flux 3 – 4 times as comparison with distilled water; enable to avoid the sudden boiling crisis unlike the single-phase heat transfer agents; have a high colloidal constancy and stability to multiple boiling-cooling cycles.
The nanofluids are obtainable, cheap, and environment friendly

Stage of Development. Suggestions for Commercialization

IRL5, TRL4
Nanofluid samples; technology and regulations for nanofluids production on industrial scale

IPR Protection

IPR3

Contact Information

Borys I. Bondarenko, The Gas Institute of the NAS of Ukraine;
+38 044 456 44 71, e-mail: bbikiev@gmail.com