N2-O-004301

LIFETIME ASSESSMENT OF RADIANT BURNERS MADE OF SHS-INTERMETALLICS*

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During the last decade, thin-shell radiant burners [1] made of porous SHS-intermetallics [2] have been developing in TSC SB RAS. Low oxidation resistance is a barrier to the successful commercialization of the burners. My presentation will be focused on recent results and prospects for the high-temperature oxidation resistance of porous Ni-Al-Cr intermetallics. The first results have shown that porous SHS-intermetallics with spheroidal elements of 1-2 mm in diameter can work for one year or more at 1000-1100 °C (Fig.1).

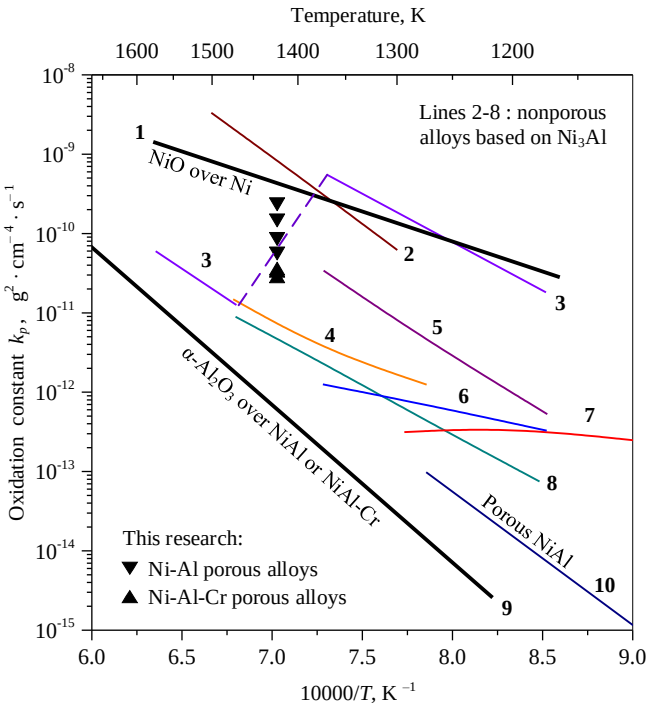

Fig.1. Arrhenius diagrams of k_p vs 10000/T for oxidation of SHS-porous alloys. Lines are literature data: 1 – NiO scale over Ni [3], 2 – pure Ni_3Al [4], 3 – Ni-11.8wt.%Al alloy [3], 4 – pure Ni_3Al [5], 5 – IC221M alloy (Ni_3Al + Cr-Zr-Mo-B) [6], 6 – nanocrystaline Ni_3Al made by MA & SPS [7], 7 – powder-metallurgical Ni_3Al [8], 8 – pure Ni_3Al [3], 9 – α-Al_2O_3 scale over B2-NiAl or NiAl-Cr [9], 10 – porous NiAl [10].

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* The research was funded by Russian Science Foundation (project № 21-79-10445).