HIGH-TEMPERATURE OXIDE ALUMOYTTRIUM FIBERS BASED ON ORGANOYTTRIUMOXANEALUMOXANES

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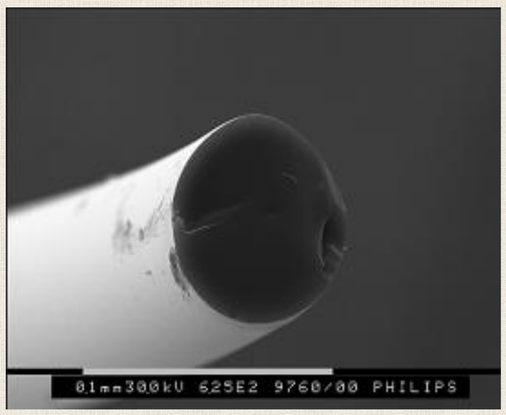
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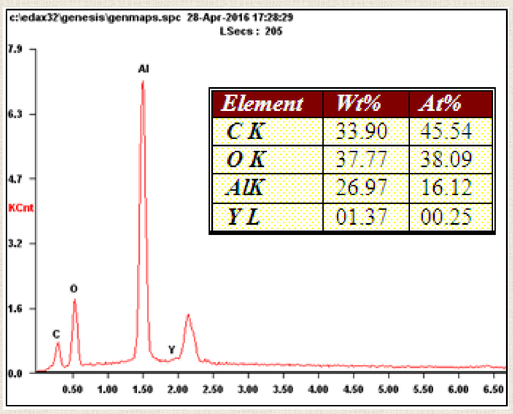
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High-temperature oxide alumoyttrium fibers were prepared by melt molding of fiber forming organoyttriumoxanealumoxanes [1,2] that were for the first time synthesized at GNIIChTEOS. The molding was carried out at temperatures of 60-150 C, with the following heat treatment in air at 1300-1500 C.

SEM and EDS of polymer fibers

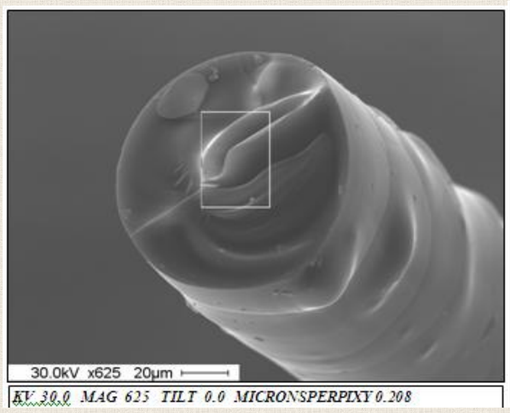
Composition 1

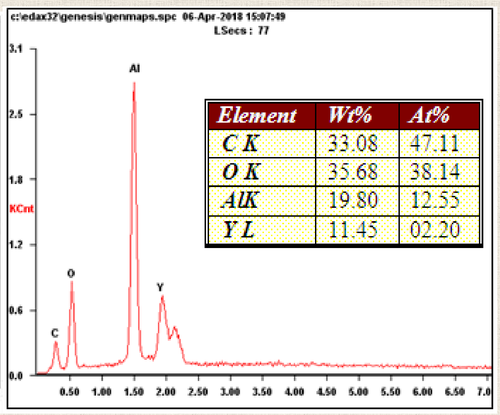




Element	Wt%	At%
C K	33.90	45.54
O K	37.77	38.09
AlK	26.97	16.12
Y L	01.37	00.25

Composition 2

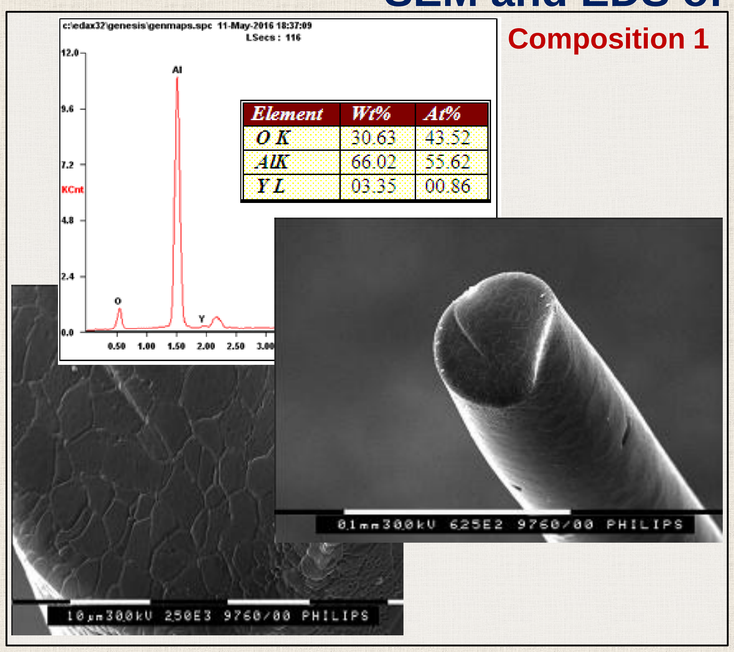




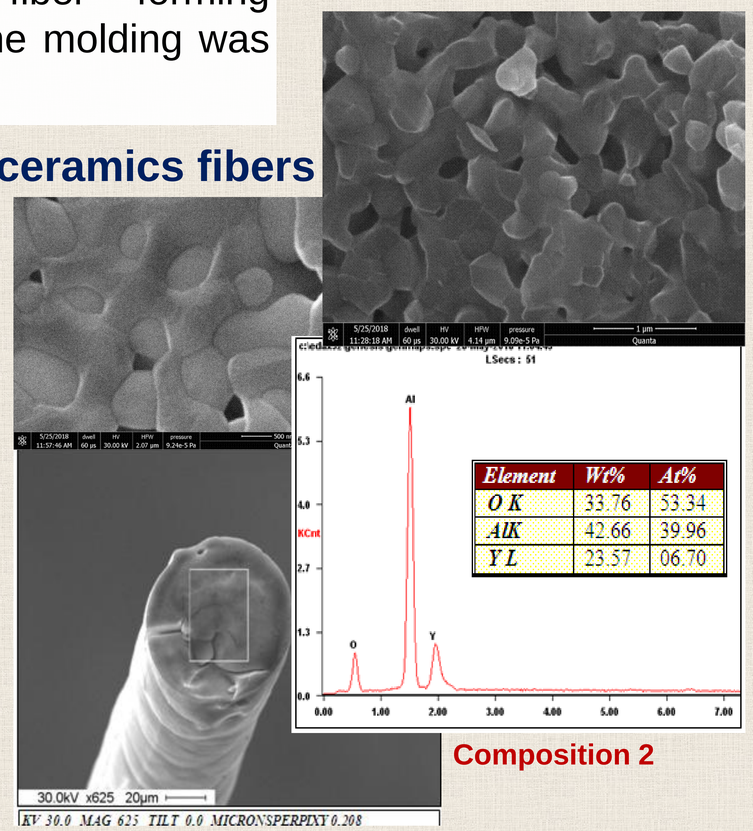
Element	Wt%	At%
C K	33.08	47.11
O K	35.68	38.14
AlK	19.80	12.55
Y L	11.45	02.20

SEM and EDS of ceramics fibers

Composition 1



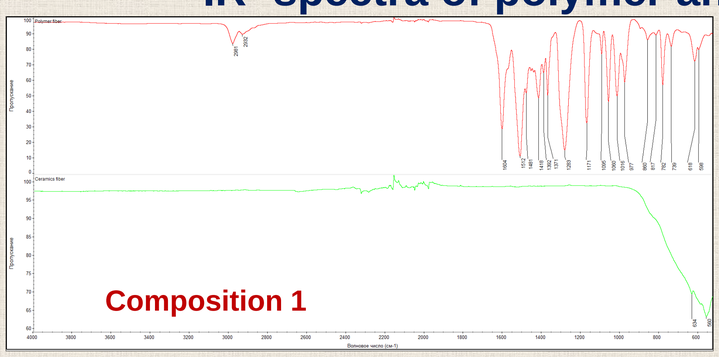
Element	Wt%	At%
O K	30.63	43.52
AlK	66.02	55.62
Y L	03.35	00.86



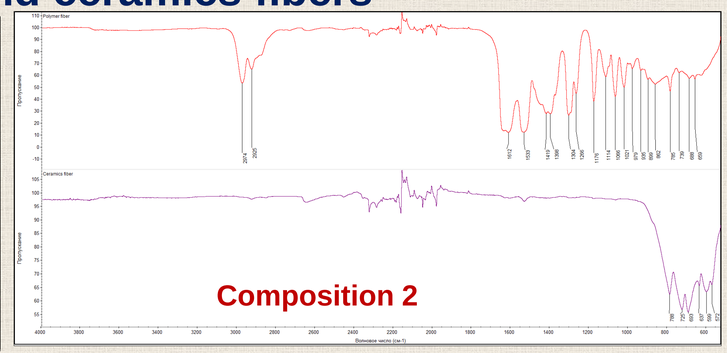
Element	Wt%	At%
O K	33.76	53.34
AlK	42.66	39.96
Y L	23.57	06.70

Composition 2

IR- spectra of polymer and ceramics fibers

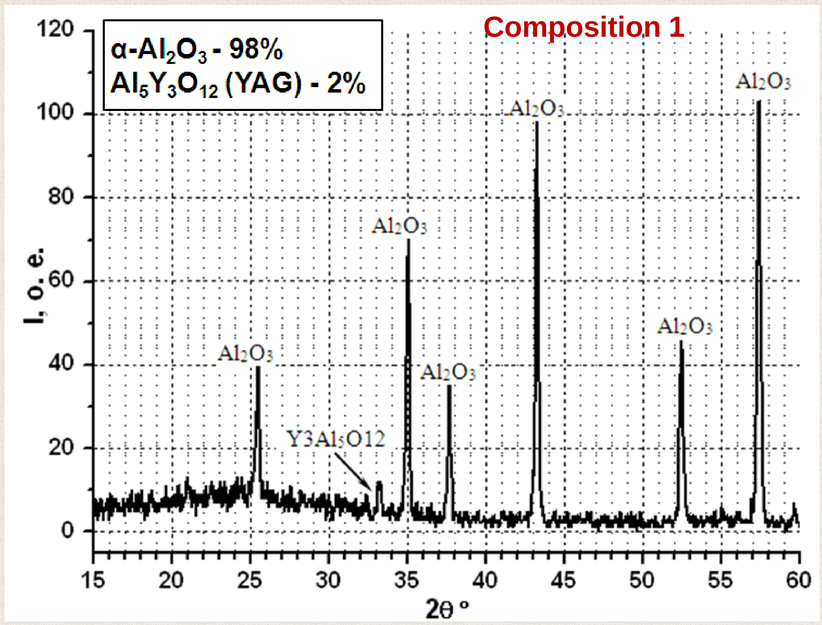


Composition 1

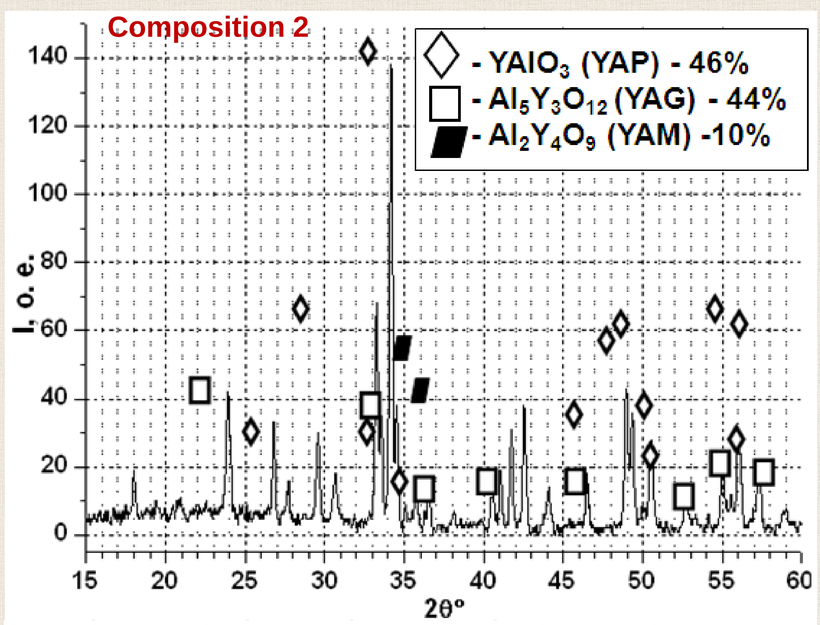


Composition 2

X-ray phase analysis of ceramics fibers



Composition 1



Composition 2

It is found that, depending on the molar ratio of Al:Y in the initial organoyttriumoxane-alumoxanes, the ceramic fibers consist of the following phases: corundum α-Al_2O_3, garnet $Y_3Al_5O_{12}$ (YAG), $YAlO_3$ (YAP) and $Y_4Al_2O_9$ (YAM). It is known that these structures have high melting points. Therefore, the obtained fibers can be used to prepare high-heat-resistant chemically inert ceramic composites.

References

1. Shcherbakova G.I., et al. Fiber-forming organoyttriumoxanealumoxanes. RF Patent 2551431, 2015.
2. Shcherbakova G.I., et al. Fiber-forming organoyttroxanealumoxanes. Inorg. Mater. 2015, Vol. 51, No. 3, pp. 206-214. DOI: 10.1134/S0020168515030140.

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