

**SPINEL-GARNET FIBERS BASED ON
ORGANOMAGNESIUMOXANE YTTRIUMOXANE ALUMOXANES**

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Fig. 1 The process of obtaining ceramic fibers of mixed oxide composition $MgAl_2O_4/Y_3Al_5O_{12}$: 1,2 – photo of polymer fiber;
3 – cured fiber at 500 °C; 4 – ceramic fiber pyrolyzed at 1300 °C

The production of fibers of mixed oxide composition $MgAl_2O_4/Y_3Al_5O_{12}$ is carried out as follows: 200 g of fiber-forming organomagnesiumoxane yttriumoxane alumoxanes with a molar ratio of Al:Y \approx 6 and Al:Mg \approx 2 are loaded in small portions into the extruder of the molding machine preheated to 110 °C. The speed of rotation of the receiving spool is set at 250 rpm for pulling and winding the polymer fiber. Then the wound polymer fiber (Fig. 1.1) is removed from the receiving spool, placed on a corundum mat and placed in an oven for further heat treatment (Fig. 1.2). Heating is carried out in an air atmosphere according to the following mode: from room temperature to 500 °C at a speed of 1 °C/min - fiber curing (Fig. 1.3), from 500 °C to 1300-1500 °C at a speed of 10 °C/min with exposure for 10 min. Heat treatment is carried out in an atmosphere of air. As a result, ceramic fibers of mixed oxide composition $MgAl_2O_4/Y_3Al_5O_{12}$ are obtained (Fig. 1.4).

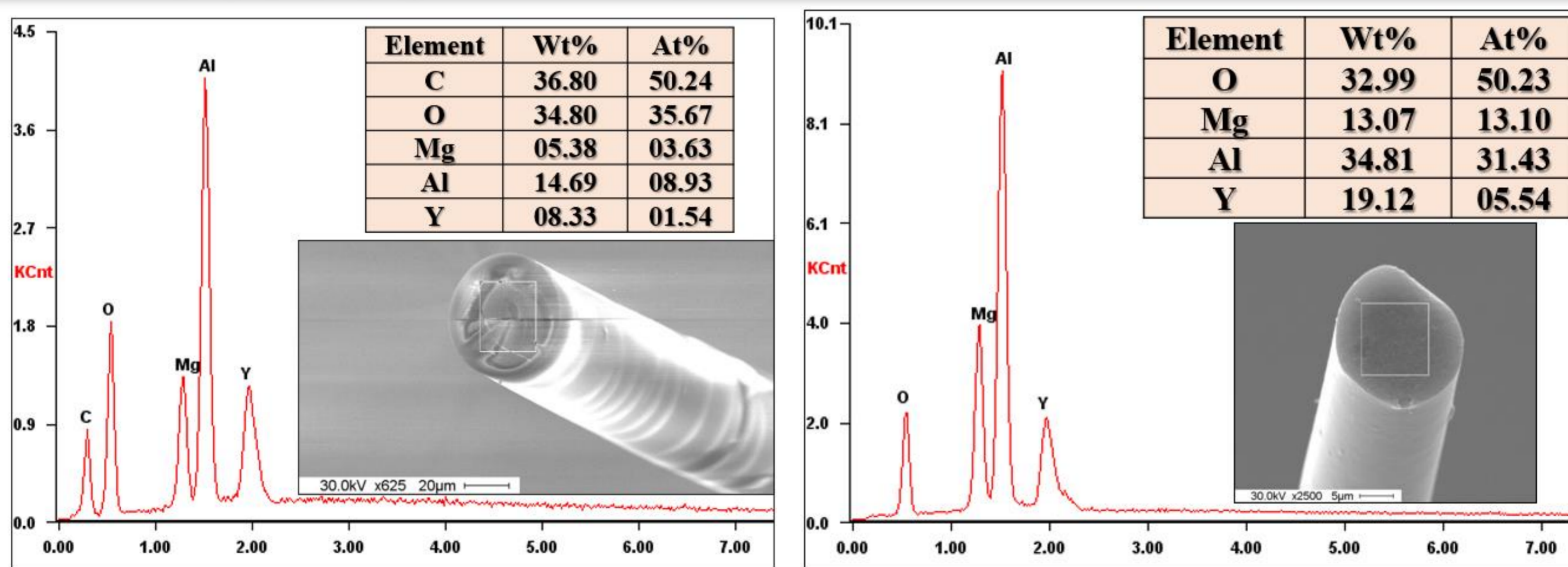


Fig. 2 SEM image and X-ray elemental microanalysis:
1 – polymer fiber;
2 – ceramic fiber pyrolyzed at 1300 °C

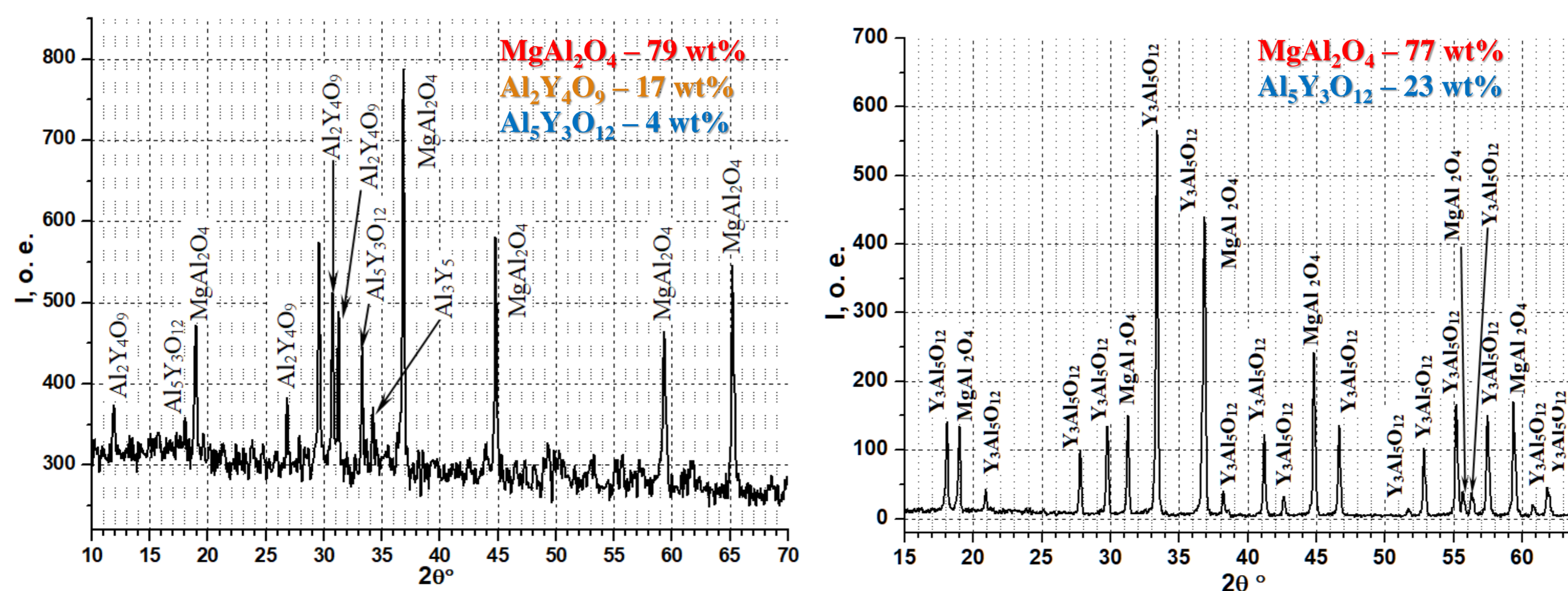


Fig.3 Diffractogram of ceramic fiber $MgAl_2O_4/Y_3Al_5O_{12}$ pyrolyzed at: 1 – 1300 °C; 2 – 1500 °C

Tensile tests show that the fibers that cure at 500 °C have strength of 150-300 MPa, however, further heat treatment of the cured fibers up to 1300 °C leads to an increase in strength up to **800 MPa**.