CONCLUSIONS

Today many new electrolyte materials with high ionic conductivity are considered, but ZrO_2^s remains the most popular because of its high stability in reducing and oxidative environments, sufficiently high strength and relatively low cost. Therefore for nearly 50 years Ni-anode ZrO_2^s has remained the most widely used in CFC. Implementation of 3,5YSZ as an alternative to 8YSZ – the main ceramic component for the manufacture of anode of CFC was appropriate, since this content and introduction of starch which was used as a pore forming agent, provided the necessary properties that have been raised for research.

The study of the influence of porosity (pore forming agent) on strength, electrical conductivity of the anode composite 3,5YSZ - NiO (60 wt.%) before and after its reduction showed that:

1. Under the same conditions of manufacture, samples 3,5YSZ - NiO (60 wt.%) after reduction at 800° C have nearly the same level of influence of the pore forming agent on porosity compared with samples sintered at a temperature of 1200 ° C. Thus, the porosity of reduced samples varied from 43 to 49%, and of the sintered ones from 42 to 49% depending on the content of pore forming agent.

2. It was discovered that an increase in pore forming agent content during sintering at 1400° C, and after reduction at 800° C the strength decreases from 94.5 to 58.5 MPa and 74.3 to 57.6 MPa respectively.

3. It was established that the electrical conductivity of anodes decreases from 1,15 10^6 S / m by 0,61 10^6 S / m with an increase in their porosity. Maximum anode conductivity was equal to 1,15 10^6 S / m at 47,5% porosity (pore forming agent content at 12% vol.).

The optimal composition of cermet for making CFC anode is the composition with the pore forming agent content (starch) of 18%, which provides optimum strength for anode composite after reduction 74.3 MPa (95 MPa after sintering) with 46% porosity and conductivity 0,9 10^6 S / m.