CONCLUSIONS

Studied peculiarities of structure formation and mechanical behavior of electrolyte.

Properties of powders have a decisive influence on the structure and behavior of fuel cells as a mechanical and electrochemical device. Thus, the authors of the report on zirconium dioxide powders UKR and the IPM 10Cc1CeSZ in comparison with their industrial analogues of the best world producers are really nanosized, 20 ... 40 nm, but not declared, as happened in the case of commercial powders of the Japanese company DKKK, where they have a size of 100 ... 200 nm. Ukrainian powders provide their electrolytes with the highest, from comparable, electrical conductivity and mechanical strength.

As for the powders of zirconium dioxide 10Sc1CeSZ themselves:

- the size of the initial particles for powders: developed by the authors of co-sedimented powder UKR 20-40 nm, DKKK - 100-200 nm;
- the DKKK powder is practically non-agglomerated; UKR - combined in soft agglomerates with size of 2,4 microns.

As for the massive samples of 10Sc1CeSZ electrolyte:

- uniformly pressed UKR electrolyte ceramics are less prone to high-temperature recrystallization than ceramics DKKK and Praxair, for which the grain size reaches 3 ... 4 microns with an increase in sintering temperature from 1300 to 1550 °C and period of 1.5 hours. The grain size in the UKR ceramics with the same conditions increases only to 1,25 microns;
- 10Sc1CeSZ ceramic uniformly pressed has following values of biaxial strength: UKR - 250 MPa at a sintering temperature of 1500 °C, DKKK - 375 MPa at 1350 °C, Praxair - 220 MPa at 1450 °C;
- ceramic from DKKK powder, uniformly pressed and sintered at 1350-1400 °C temperatures, has a maximum strength of 375 MPa, which is likely due to the presence of still undissolved boundaries between primary particles, sub-grains, internal boundaries, which are essential barriers for spliting cracks, which causes their slowdown and fragmentation of their surfaces.