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## Synthesis, Thermal properties and electrical conductivity of Na-Sialate geopolymer

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This work aims to study the thermal behavior of basic-geopolymers derived from met kaolin (clay). The geo polymers were characterized by different techniques: thermal analysis (DTA, TGA), X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FTIR) and impedance spectroscopy. Some physicochemical properties of the products were also determined: the phases obtained after geo polymer heat treatment and their electrical properties. The results obtained after drying and heat treatment showed that the products kept their initial shapes, but revealed variable colors depending on the temperatures at which they were treated. The products obtained are amorphous between 300°C up to 600°C with peaks relating to the presence of Nano crystallites of Muscovites and zeolite, thus at 900°C it is quite amorphous but only contains Nano crystallites of Muscovites. From the temperature of 950°C, we notice that the geo polymer has been transformed into a crystalline compound predominated by the Nepheline (NaAlSiO4) with the presence of a crystalline phase by minor peaks of Muscovite, this crystalline character has been increased at 1100°C to obtain a whole phase crystalline of a Nepheline The treatment of this geo polymer for one hour at 1200°C shows an amorphous phase again corresponding to corundum (α-Al2O3). This indicates that the dissolution of the grains by the liquid phase induces the conversion of the material structure from sialate [-Si-O-Al-O] to sialate siloxo [-Si-O-Al-O-Si-O-] and the formation of a new crystalline phase (α-Al2O3). This development of sialate to sialate-siloxo was confirmed by IR spectroscopy. As mentioned above, from 300 to 900°C, Na-sialate geo polymer exhibits the same disorder structure of nepheline. The crystal structure of nepheline is characterized by layers of six-membered tetrahedral rings of exclusively oval conformation. The rings are built by Regularly alternating tetrahedral AIO4 and SiO4. Stacking the layer's parallel to the c axis gives a three-dimensional network containing channels occupied by Na cations. This topology favors easy movement of Na+ ions throughout the structure. For this reason, ionic migration in nepheline is widely reported. The refinement of Na-Sialate geo polymer at room temperature gives bulk high ionic conductivity of about 5.10-5 S. cm-1 and this is due to the probable joint contribution of H+ and Na+ ions.

## **Biography**

Fatma Zahra SOUISSI graduated from the Chemistry Department of the University of Sfax, Tunisia in 2018 obtained her doctorate from the same university by doing research internships at the University of Maine at the Faculty of Science and Technology of Le Mans, these research studies are on the preparation and physicochemical characterization of new materials. she did her master's in 2012 in collaboration between the University of Sfax and the University of Maine also in the laboratory of oxide and fluoride glasses of the chemistry departments, she worked on the preparation of new glasses of BaBr fluoride fluoride glasses doped with trace Europium Synthesis In a glove box and characterization by DRX, DSC, ATGATD, Fluorescence. In 2010 she finished her fundamental degree in Physics and Chemistry