(XRPD) patterns revealed the new compound to have a vaterite-type and warwickite-type structure, respectively. The modification with vaterite-type structure is known for other rare earth borates, for example, YBO_3 and $YbBO_3$, as a stable form. The warwickite-type phase is known for $M_1^{3+}M_2^{2+}OBO_3$-type compounds. $ScBO_3$ was believed earlier to have calcite-type structure type only. Non-equilibrium processes during heating-quenching cycles lead to form new metastable phases in $ScBO_3$. We curried out detailed studies of $ScBO_3$ structural transformations by differential scanning calorimetry and *in situ* x-ray powder diffraction techniques. The quenched samples were characterized by IR spectroscopy, as well as XRD. We revealed that non-reversible sequence of amorphous→ warwickite-type→ vaterite-type →calcite-type transformations took place in the temperature range 1036-1054 K. Total exothermal effect for the amorphous→ warwickite-type→ vaterite-type transformations correspond to ΔH=142.4 J/g and that of vaterite-type →calcite-type transition is ΔH=85 J/g. The lattice parameters of the $ScBO_3$ warwickite-type structure are *a*=9.4248 Å, *b*=9.4451 Å and *c*=3.3969 Å, β=90.309, S.G.=$P2_1/n$ and ones of the vaterite-type structure are *a*=3.8952 Å, *c*=7.8772 Å, S.G. = $P6_3/mmc$, respectively.
The details of the crystal structures will be discussed in the presentation.
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Keywords: complex oxides; nanomaterials; X-ray powder diffraction

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Mineral Apatite as a Periodic Model of Surface to Living Cell Growth. Marzena Suder[a], Małgorzata Tyszka-Czochara[b], Katarzyna Stadnicka[a]. [a]*Jagiellonian University, Faculty of Chemistry, Krakow, Poland.* [b]*Jagiellonian University, Faculty of Pharmacy, Krakow, Poland.*
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A mineral apatite, $Ca_5(PO_4)_3(F,OH,Cl)$ as a main source of phosphorus in nature, has a great importance in designing materials useful for medical purposes. Moreover, it is worth to say, that the mineral single-crystal apatites can obtain size up to several centimeters [1]. In comparison to above, a calcium deficient carbonate-hydroxylapatite suitable as a mineral part of vertebrates bones, occurs in shape of nano-sized crystals [1,2]. The hydroxylapatite, with a chemical composition similar to biological apatites and its proved biocompatibility, is broadly applied in medicine and stomatology [3]. It is interesting to what extend the different crystallographic orientation of the single-crystal faces has influence on living cell growth. Two types of geological crystals of different origin, with molecular formulas $Ca_{10}(PO_4)6F_{1.38}(OH)_{0.62}$ (I) and $Ca_{10}(PO_4)6F_{1.09}(OH)_{0.86}Cl_{0.05}$ (II), were studied. The material was characterized by various methods – polarizing microscopy, single-crystal X-ray diffraction and energy-dispersive X-ray spectroscopy for the evaluation of surface chemistry. In both cases lattice symmetry was found to be hexagonal with the point group P63/m and following unit cell parameters: a=9.3839(4) Å, c=6.8867(3) Å for (I) and a=9.4058(4) Å, c=6.8807(3) Å for (II). A basis to assume right model of the surface of the following faces: (10-10), (0001) and (10-11) was structural analysis. Subsequently, a chosen cell line of human fibroblasts has been grown on the prepared crystal plates with orientations (10-10), (0001) and (10-11). We hope that the studies will shed light on the understanding of living cell – apatite substrate interactions at atomic level.

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Keywords: biomaterials; apatites; single-crystal X-ray diffraction

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Kinetics of the Dehydroxylation and Mullitization Processes of Nanotubular Halloysıte Mineral. Mohamed Reda Boudchicha[a], Hocine Akkari[a], Abdallah Chorfa[b], Leila Kadissa[a], Widad Moumene[a]. [a]*University of 20 Aout 1955/Department of fundamental Sciences/Skikda-Algeria.* [b]*University of 20 Aout 1955/Department of Mechanical Engineering /Skikda-Algeria*
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A mineral clay deposit from the locality “Guelma”, was investigated. The exploitation of the results of chemical, X-rays, IR and differential thermal analyses shows that the raw material is essentially formed with halloysite. Examined with S.E.M., the clay particles have a nanotubular form with 100 to 300nm in length and 20 to 50 nm in externall diameter. The activation energy of dehydroxylation was determined as 160 $kJ.mol^{-1}$, while the value for mullitisation is 844 $kJ.mol^{-1}$.

Keywords: halloysite; natural nanotube; kinetics of dehydroxylation

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Defects in Fluorite Structure Caused by Natural Irradiation. Vojtěch Vlček[e], Roman Skála[a], Jakub Čížek[d], Jan Drahokoupil[b], Jan Valenta[c], Jana Ederová[f], Viktor Goliáš[e]. [a]*Academy of Sciences of the Czech Republic, v.v.i. Institute of Geology, Prague, Czech Republic.* [b]*Academy of Science of The Czech Republic, v.v.i., Institute of Physics, Prague, Czech Republic.* [c]*Charles University in Prague, Department of Chemical Physics and Optics, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic.* [d]*Charles University in Prague, Department*