

MS14-01 | SEARCH FOR NEW TELLURIUM AND SELENIUM OXIDES WITH POTENTIAL FERROELECTRIC AND MULTIFERROIC PROPERTIES

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The synthesis of new non-centrosymmetric compounds is a very interesting challenge for solid-state chemistry. Indeed, non-centrometry is the prerequisite for obtaining materials with functional properties such as piezoelectricity, pyroelectricity, ferroelectricity. Conjugated to a magnetic order, it can induce multiferroicity. In the family of oxides, the use of cations subject to Second Order Jahn-Teller (SOJT) distortions able to provide asymmetric coordination environments with local dipole moments, may favor the emergence of the non-centrosymmetry. Among these cations we can find those with active non-bonded electron pair such as Se^{IV} and Te^{IV} . With these cations numerous of noncentrosymmetric oxydes have already been synthesized by solid state reactions. Alternative reaction routes are now exploring to get new non-centrosymmetric phases. The solvothermal syntheses and more particularly hydrothermal syntheses are promising methods to explore chemical systems to get new compounds or new polymorphs with original crystal structures as well as for growing crystals. Compare to solid state synthesis, many parameters (pH, concentration, precursors, oxido-redox conditions, temperature, pressure, time, etc.) are adjustable in hydrothermal synthesis which offer a substantial number of configurations and thus increased the chances of getting new phases. In a second time, the X-ray and neutron diffraction experiments are necessary to solve the new structures and follow the phase-transitions. During the presentation, I will present chemical systems such as (Ca, Sr, Co) - Te^{IV} - O and Co - Se^{IV} - O explored by conjugating hydrothermal synthesis assisted by microwave, conventional hydrothermal synthesis and crystallographic studies.