

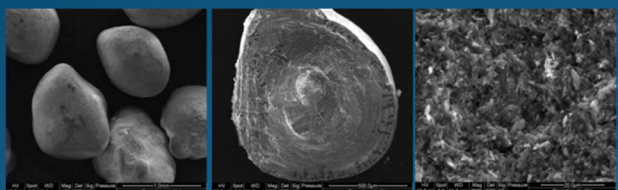


Nanochemistry of peroxides

V.M. Novotortsev, P.V. Prikhodchenko, T.A. Tripol'skaya

Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences

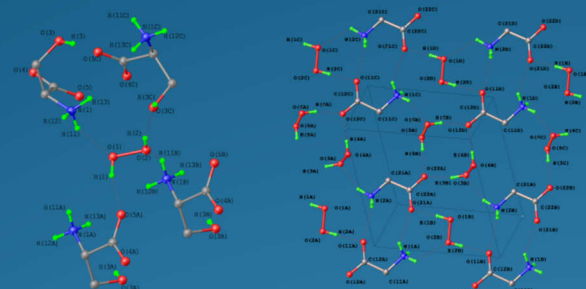
Granulation and nanocapsulation of perhydrates



Sodium percarbonate granulated with peroxosilicate and capsulated with polyphosphate

A.V. Zhubrikov, E.A. Legurova, V. Gutkin, V. Uvarov, N.V. Khitrov, O. Lev, T.A. Tripol'skaya, P.V. Prikhodchenko. *Russ. J. Inorg. Chem.*, 2009, 54, 9, 1455 – 1458.

Amino acids perhydrates - new generation of active oxygen sources



L-serine perhydrate

Glycine perhydrate

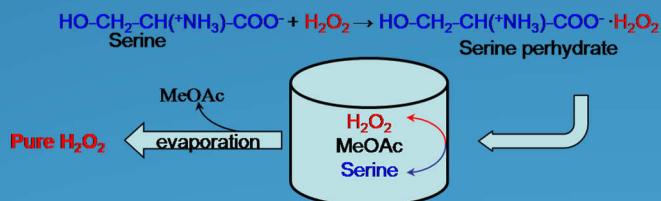
A. V. Churakov, P. V. Prikhodchenko, J. Howard, O. Lev. *Chem. Comm.* 2009, 28, 4224.

The structures of 15 natural amino acid hydrogen peroxide solvates are characterized by XRD. All obtained compounds melt without decomposition in the temperature range 50+80°C. Glycine perhydrate $C_2H_5NO_2 \cdot 1.5H_2O_2$ contains 40.47% hydrogen peroxide – a record for organic peroxosolvates.

Amino acids perhydrates applications:

- 1) medicine
- 2) food industry
- 3) water disinfection
- 4) solid sources of active oxygen
- 5) preparation of pure hydrogen peroxide and anhydrous peroxide solutions
- 6) model compounds for hydrogen bonding study

Preparation of pure hydrogen peroxide and anhydrous peroxide solutions from crystalline serine perhydrate



Scheme of pure hydrogen peroxide preparation

Y. Wolanov, O. Lev, A.V. Churakov, A.G. Medvedev, V.M. Novotortsev, P.V. Prikhodchenko. *Tetrahedron* 2010, 66, 5130.

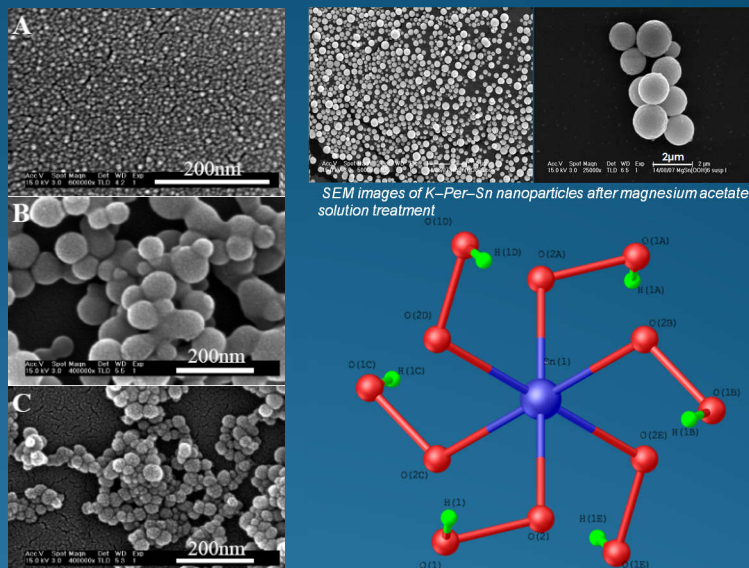
Peroxides – model compounds for hydrogen bonding study



The infinite ionic chains in the crystal build by the (O – H...O)-fragments interacting by strong short H-bonds

A.V. Churakov, P.V. Prikhodchenko, O. Lev, A.G. Medvedev, T.A. Tripol'skaya, M.V. Vener. *J. Chem. Phys.* 2010, 133, 164506.

Nanoparticles of tin(IV) hydroperoxocomplexes



SEM images of K-Per-Sn nanoparticles after magnesium acetate solution treatment

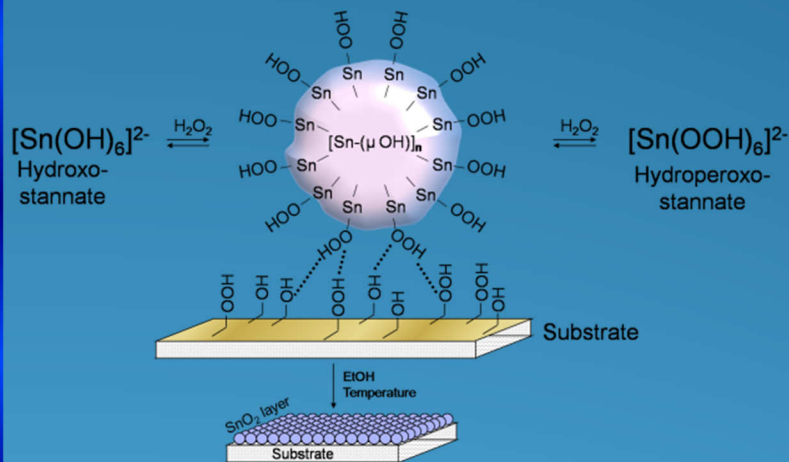
(a-c) SEM images of K-Per-Sn nanoparticles

X-ray crystal structure of anion $[Sn(OOH)_6]^{2-}$ in cesium hydroperoxostannate

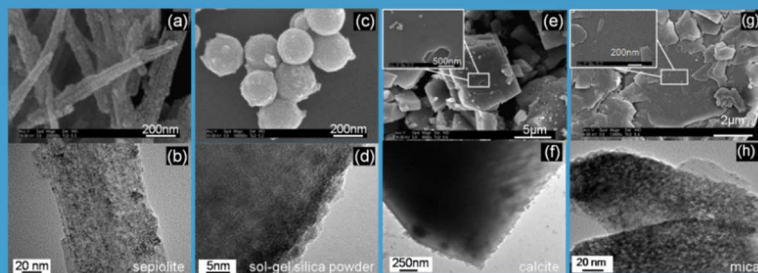


- 1) A.V. Churakov, S. Sladkevich, O. Lev, T.A. Tripol'skaya, P.V. Prikhodchenko. *Inorg. Chem.* 2010, 49, 4762.
- 2) S. Sladkevich, V. Gutkin, O. Lev, E.A. Legurova, D.F. Khabibulin, M.A. Fedotov, V. Uvarov, T.A. Tripol'skaya, P.V. Prikhodchenko. *J. Sol-Gel Sci. Technol.* 2009, 50, 229.

Antimony doped tin (IV) oxide nanoparticle (5 nm) formation from hydrogen peroxide solutions: a new generic transparent and conducting film coating from basic solutions



Scheme of tin oxide nanoparticle formation, hydrogen peroxide stabilization and preferential deposition on mineral surfaces



SEM (a, c, e, g) and TEM (b, d, f, h) images of ATO coated substrates

S. Sladkevich, A.A. Mikhaylov, P.V. Prikhodchenko, T.A. Tripol'skaya, O. Lev. *Inorg. Chem.*, 2010, 49 (20), 9110.