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INFLUENCE OF MODIFICATION THE INORGANIC-ORGANIC SILICA COATINGS BY ACTIVE AGENTS TO LONG TERM PROTECTION OF P265GH STEEL

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EXPERIMENT

Substrates (P265GH steel) were sanding (finished of gradiation 800), digested with 0,15% HNO_3 degreased in acetone before layer applying. Organic-SiO_2 coatings were obtained by the sol-gel method. GPTMS (3-glicydoxypropyltriimethoxysialne), ApTEOS (aminotriethoxysilane) were used as precusors, mixed HNO_3 and CH_3COOH were used as catalyst and metahnol as oslvent were used in sol-gel synthesis of sol for coating materials. Layers were deposited on steel surface with using dip-coating method (Fig 1) and stabilized in 180^0C.

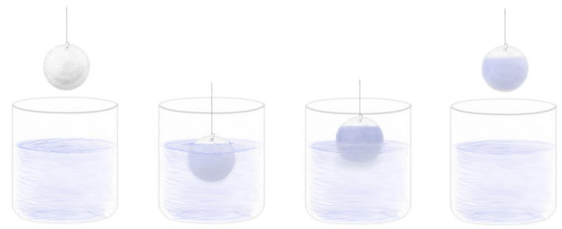

Fig. 1 Scheme of the layer applying by dip-coating method

RESULTS

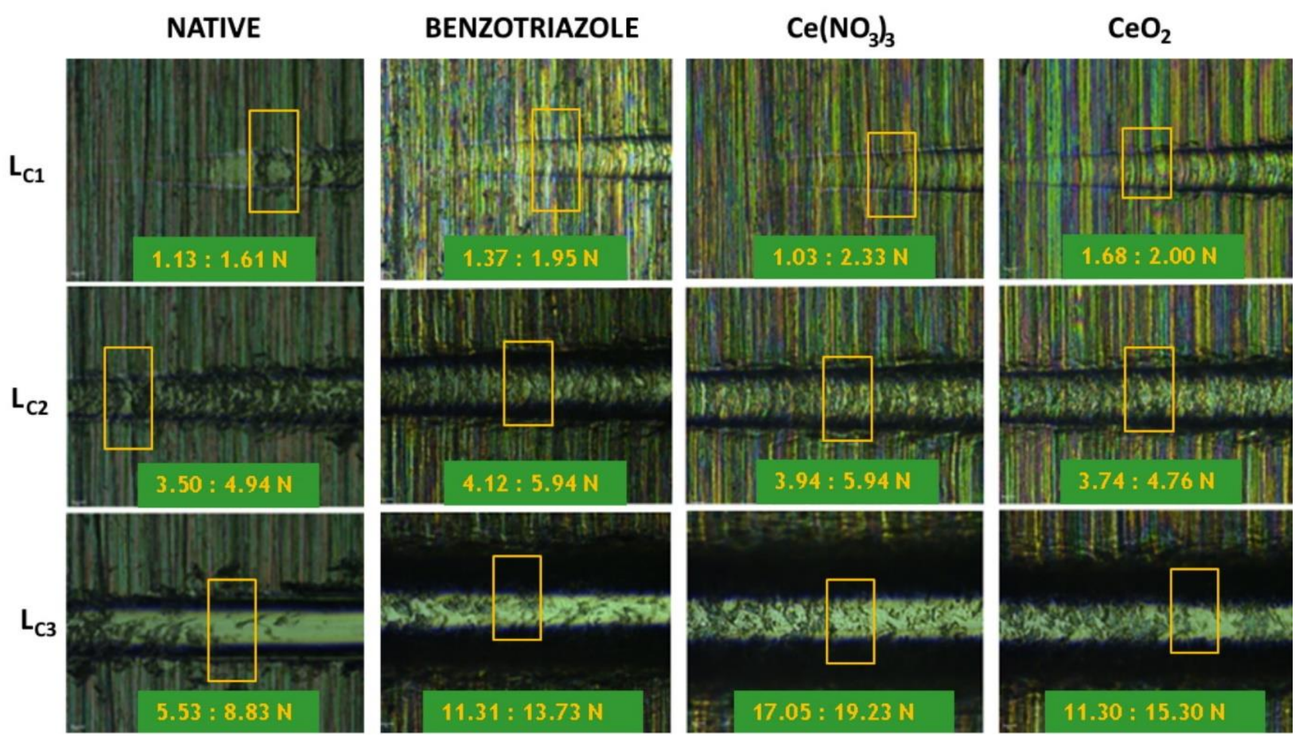

Fig 2. Scratch test results for SiO_2 coatings

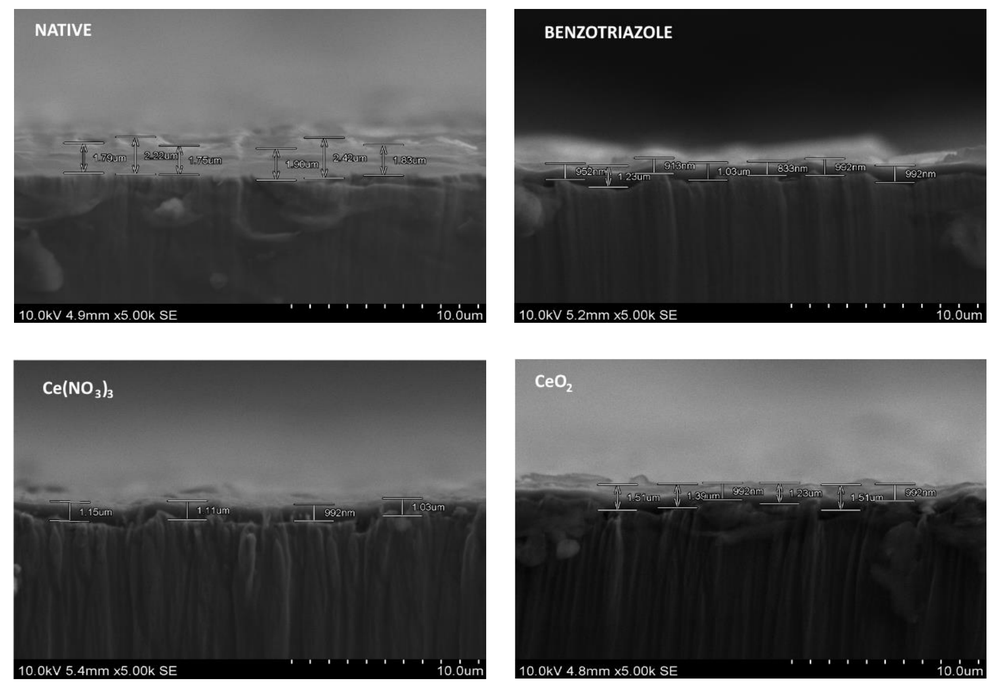

Fig 3. SEM for SiO_2 coatings

L_{C1} - cracking of the coating, L_{C2} - characteristic chipping of the coatings,
L_{C3} - penetration of the coating into the substrate in the middle of the scratch

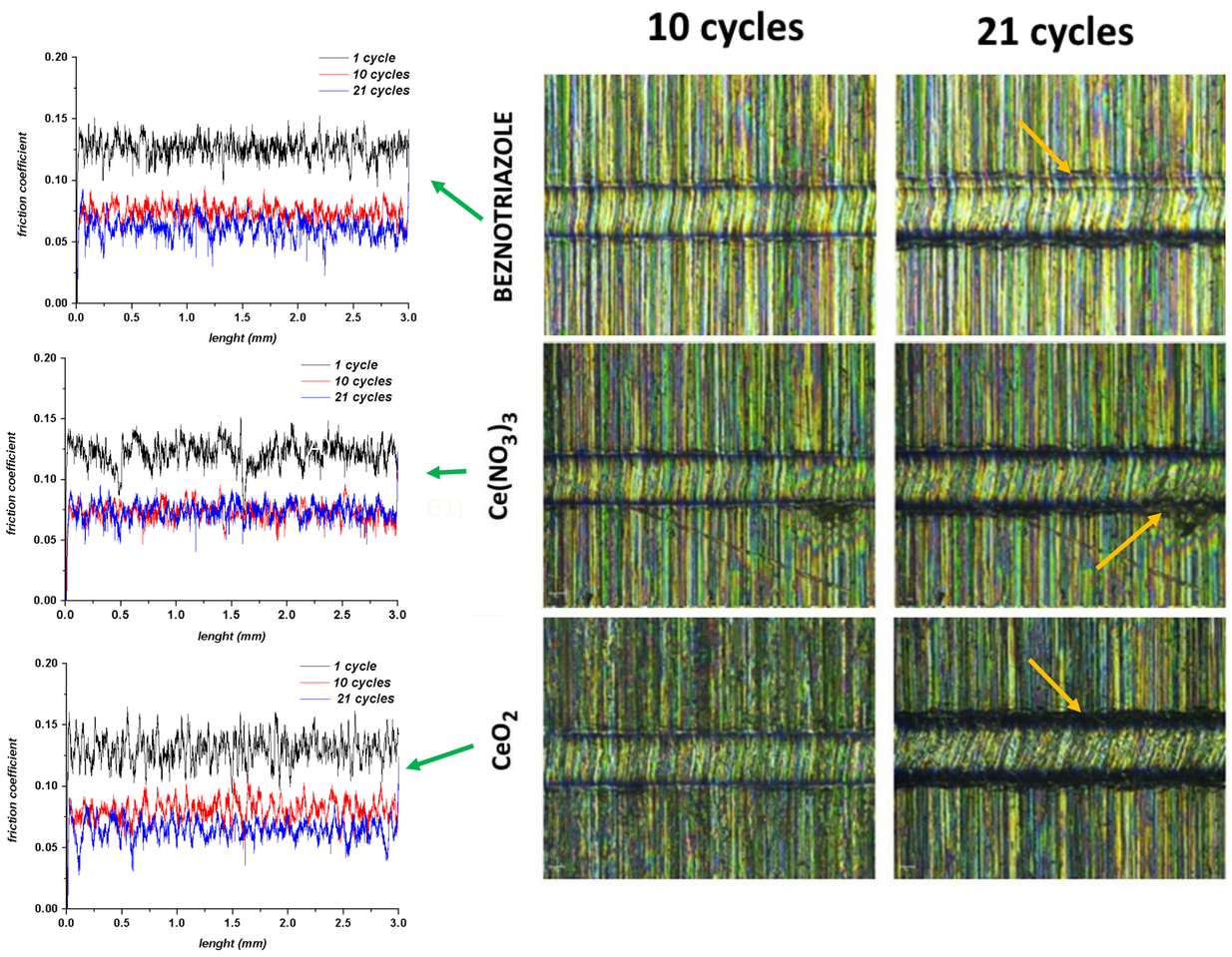

Fig 4. Multiscratch test results for SiO_2 coatings (load 1N)

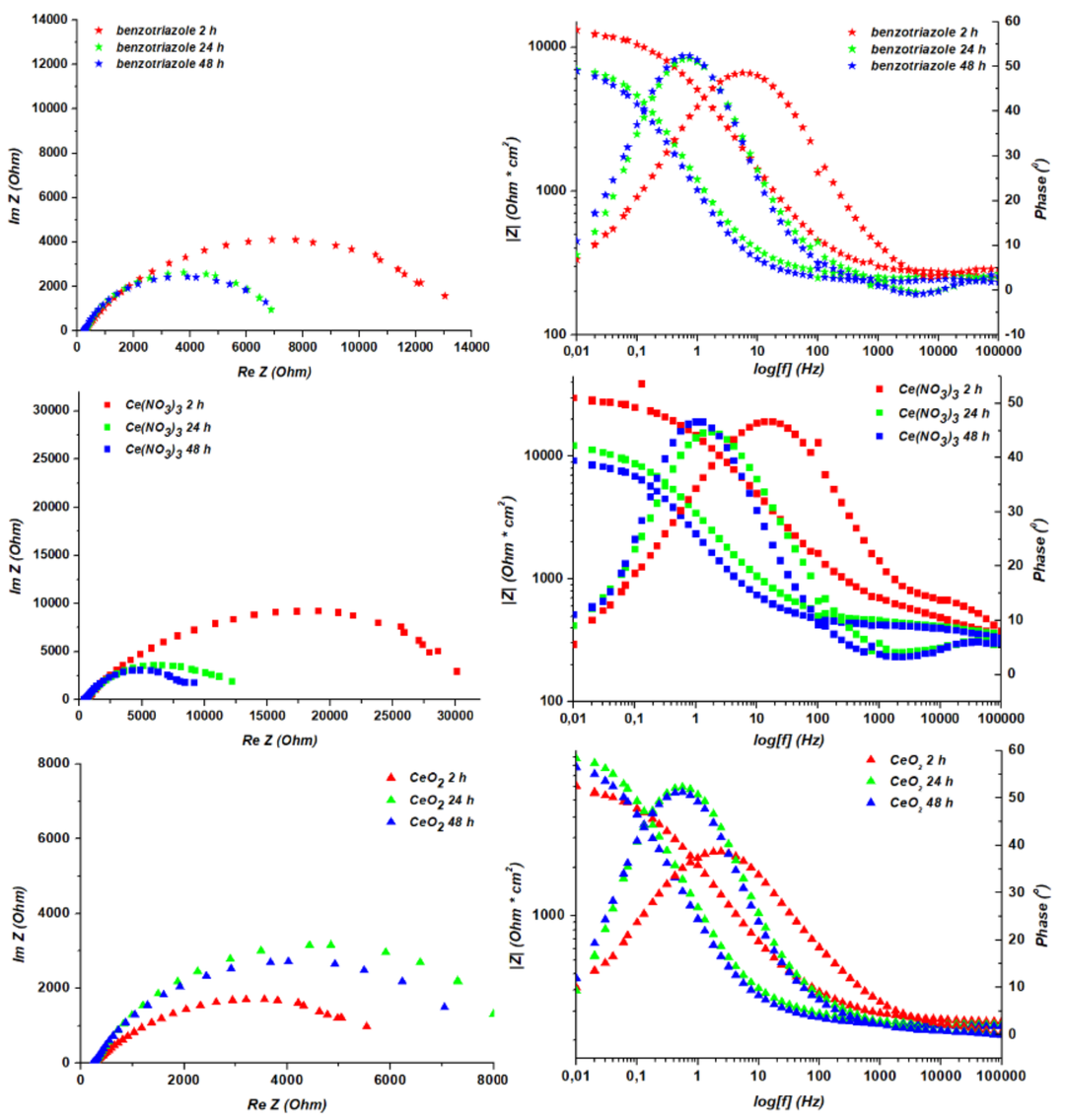

Fig 5. EIS results for SiO_2 coatings in 3% NaCl (after multriscratch test)

CONCLUSIONS

- Changing the parameters of sol-gel synthesis of protective coatings, affects the control of their properties at the molecular level, which largely allows the control of the oxide structure, and thus obtaining materials with desirable protective properties.
- The $Ce(NO_3)_3$ modification increase adhesion of coating to metallic subsrate. Additionaly friction coefficient remanded unchanged for 10 and 21 cycles of multiscratch test (reciproating motion wit 1N load).
- The CeO_2 modification provided protection of metallic substrate after 48 h immersed in 0.3% NaCl after multiscratch test.

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