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Catalytic potential and electrical properties of molybdenum and vanadium coordination complexes derived from acetic acid hydrazide

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Introduction

The literature data flourishes with molybdenum and vanadium compounds prepared by reactions of vanadium with different aroyl-hydrazones. Mo and V coordination complexes prepared from acyl-hydrazones are few in number. Many obtained transition metal complexes containing aroyl-hydrazone-based ligands showed good activity and were classified as efficient catalytic systems, especially in oxidation reactions, while the electrical/dielectric properties of transition metal coordination complexes are still a new research area. The aim of the presented research is to test the catalytic activity of the obtained Mo and V compounds for linalool oxidation. (Di)electric properties of V compounds were investigated in situ impedance spectroscopy method in a wide frequency and temperature range.

Synthetic pathway

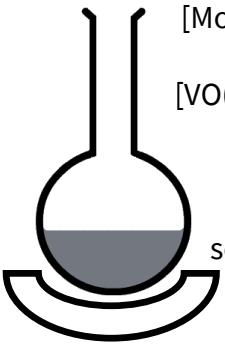

Fig. 1. Apparatus used for the solution-bases synthesis

Crystal structures

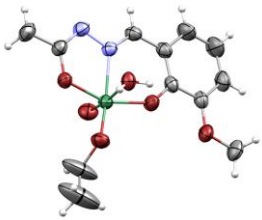

Fig. 2. $[VO(L)(OEt)(H_2O)]$

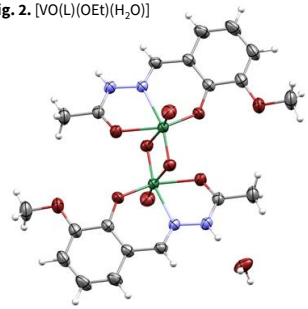

Fig. 3. $[VO_2(HL)]_2 \times H_2O$

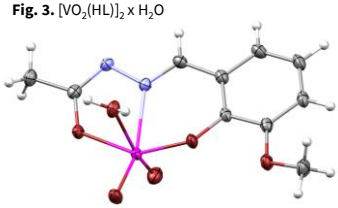

Fig. 4. $[VO_2(HL)(H_2O)]$

(Di)electric properties

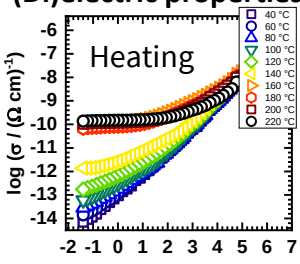

Fig. 5. Conductivity spectra for [VO(L)(OMe)(MeOH)]

Catalytic testing

Table 1. Linalool oxidation with **V** catalyst and H_2O_2.
*F=Furanoid, P=pyranoid

	[VO(L)(OEt)(H_2O)]	[VO(L)(OMe)(MeOH)]
Conversion (%)	24	22
Selectivity F (%)	26	57
Selectivity P (%)	12	23

Table 2. Linalool oxidation with **Mo** catalyst and H_2O_2.
*F=Furanoid, P=pyranoid

	[MoO(L)(H_2O)]	[MoO(L)(MeOH)]
Conversion (%)	45	60
Selectivity F (%)	49	32
Selectivity P (%)	33	22

Conclusions

Prepared molybdenum and vanadium coordination complexes with acyl-hydrazone-based ligands show good catalytic properties for linalool oxidation, with H_2O_2 as an oxidant. Vanadium complexes can be used as semiconductors and that role will be further investigated.

Acknowledgments

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