

**Title of the Innovation:** “A new derivative of  $\beta$ -ketoimine, the method of its preparation and its application”, Polish patent application no. P.442807 (2022).

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**Abstract:**

The subject of the invention is derivative of a new  $\beta$ -ketoimine, which is 4-(3-triethoxysilylpropylimino)-3-ethyl-pentan-2-one with the structural formula:

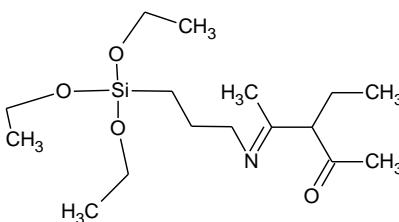


Figure 1. Structure of a new synthesised  $\beta$ -ketoimine 4-(3-triethoxysilylpropylimino)-3-ethyl-pentan-2-one

The subject of the invention is also a method for obtaining this derivative. The synthesis procedure consisted of the addition of 3-ethyl-pentane-2,4-dione to 3-aminopropyltriethoxysilane in a 1:1 molar ratio of reagents and subsequent elimination of the water molecules by heating the mixture with constant stirring at a temperature from the boiling point of 3-ethyl-pentane-2,4-dione to 100°C for 1 - 2 hours. The obtained product was recrystallized by a known method.

The essence of the invention is also the use of a new derivative as compound that binds metal ions from solutions. The obtained complexes are characterized by high stability, which is why they are of great importance in many fields of technology, e.g. can be used as compounds binding metal ions from solutions in: chemical analysis, ion exchange processes, membrane processes, adsorption, solvent extraction, metal separation in hydrometallurgy or catalysts used in industrial organic synthesis.

## Images

The simplified schema of the probable synthesis of 4-(3-triethoxysilylpropylimino)-3-ethylpentan-2-one is presented below:

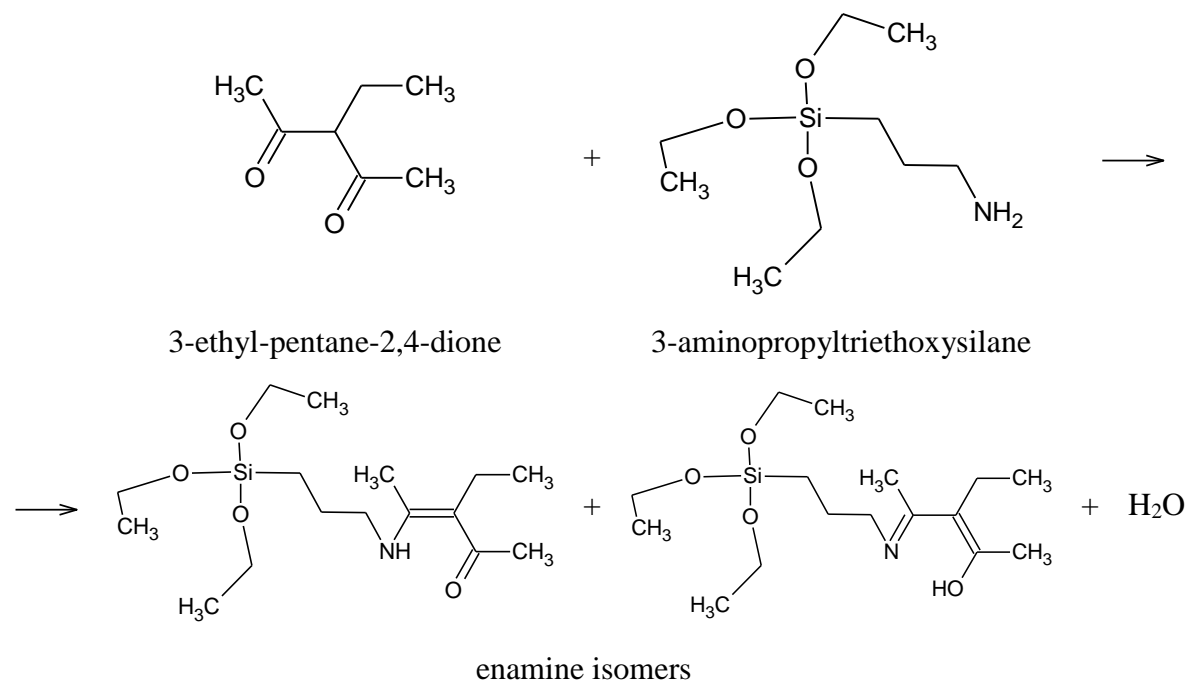
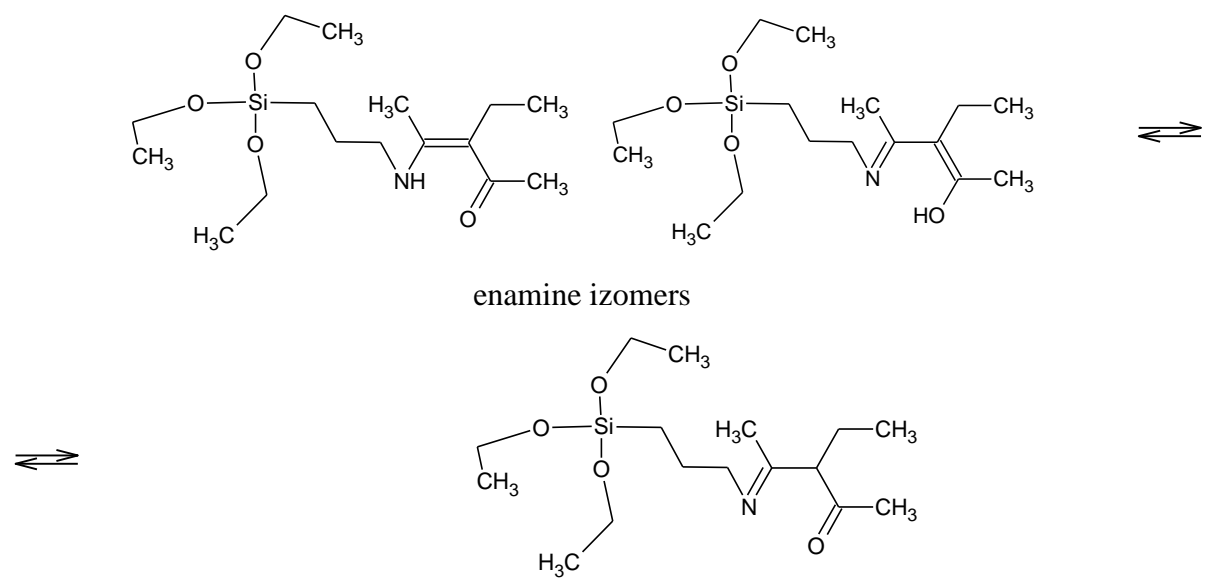


Figure 2. Simplified schema of the synthesis of enamine isomers

As a result of the reaction between 3-ethyl-pentane-2,4-dione and 3-aminopropyltriethoxysilane a mixture of two enamine isomers is probably formed. The progress of this reaction is indicated by the amount of produced water (Fig. 2). Then enamine isomers rapidly tautomerase into ketoimine a 4-(3-triethoxysilylpropylimino)-3-ethylpentan-2-one (Fig. 3).



4-(3-triethoxysilylpropylimino)-3-ethylpentan-2-one

Figure 3. Transformation of enamine isomers to the final product