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Transformations of peroxide ozonolysis products of linear terminal alkenes under the action of hydroxylamine

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Abstract

It is known that when hydroxylamine is used in the ozonolysis-reduction reactions in the form of a hydrochloric acid derivative, carboxylic compounds are formed: carboxylic acids and esters formed either individually or mixed with oximes or nitrites formed as a result of the "aldehyde → aldoxime → nitrile → carboxylic acid or ester". Using the example of non-1-ene, 10-undecenoic acid, 10-undecenoic acid methyl ester and 10-undecene-1-ol, the reactivity of hydroxylamine formed *in situ* from its hydrochloride by neutralizing hydrogen chloride with sodium acetate relative to peroxides obtained by ozonolysis terminal linear alkenes. The test substrates were oxidized with an equimolar amount of ozone in methanol at 0 °C, then without isolation of the intermediate products, it was treated with a mixture of (1:2) $NH_2OH•HCl$ and AcONa. It was found that under these conditions hydroxylamine, in contrast to its hydrochloride, is a more chemoselective reagent, and the presence of various functional groups affects the structure of reaction products. Unsubstituted alkenes or ester group-containing hydroxylamine are converted to esters, which are probably due to the dehydration of the corresponding methoxy hydroperoxides under the conditions of acetate buffer formation. If a proton-donor group is present in the alkene molecule, then it can participate in the stabilization of the zwitterion. Formed from substrates with acid or alcoholic group peroxides are less susceptible to dehydration, therefore under the conditions of the reaction medium they are reduced to aldehydes, isolated as oximes or acetals with the predominance of the latter.

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