## SULFUR-CONTAINING ELECTROPHILES AS INITIATORS FOR CYCLIZATION OF ISOPRENOIDS

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On the example of the reaction for the cyclization of the trans-geranic ester (I) it was shown that sulfur-containing electrophiles can be used as initiators for the cyclization of 1,5-dienes. The reaction can be run by one of the following methods: a) as a direct reaction using a reagent of the  $RS^+SbF_6^-$  type, and b) as a stepwise process, which includes the prior preparation of the addition product to the terminal double bond (II) and its subsequent cyclization under the influence of  $AgBF_4$  or  $AgSbF_6$ .



<u>Method a</u>. To a solution of 0.22 g of  $C_6H_5SCl$  in 1 ml of  $CH_3NO_2$ , cooled to  $-20^{\circ}C$ , was added a solution of 0.18 g of (I) and 0.53 g of  $AgSbF_6$  in 3 ml of  $CH_3NO_2$ , after which the reaction mass was treated with a mixture of ether and aqueous  $Na_2CO_3$  solution. By preparative TLC  $(Al_2O_3)$  we isolated 0.1 g (35%) of product (III). NMR spectrum ( $\delta$ , ppm, HMDS): 0.87 and 1.1 [ $(CH_3)_2C$ ], 1.50 ( $CH_3 - C = C$ ), 3.57 ( $COOCH_3$ ), 2.92 (H-C-SR), 5.35 (CH=C), 7.2 ( $C_6H_5S$ ). The elemental analysis corresponds to the empirical formula  $C_{17}H_{22}O_2$ . Mol. wt. 290 (mass-spectrometrically).

<u>Method b.</u> To a solution of 0.18 g of (I) in 1.5 ml of  $CH_3NO_2$  at  $-5^{\circ}$  was added 0.16 g of  $C_6H_5SCl$  in 1.0 ml of  $CH_3NO_2$ , and the mixture was kept at  $-5^{\circ}$  for 90 min. Then a solution of 0.25 g of  $AgSbF_6$  in 1.6 ml of  $CH_3NO_2$  was added in 1 min at  $-20^{\circ}$ , after which the mixture was kept at -20 to  $-25^{\circ}$  for 30 min and then worked up in the usual manner. After isolation and purification, we obtained 0.13 g (45%) of (III), which was identical (GLC, IR, and NMR spectra) with the above-described product.

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