The Reaction of Sulfonyl Isocyanates with Vinyl Ethers

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Sulfonyl isocyanates (1) [1], e. g. *p*-toluenesulfonyl isocyanate, react very rapidly and quantitatively with vinyl ethers giving *N*-substituted 4-alkoxyacetidin-2-ones (2) or *N*-substituted β -alkoxyacrylamides (3).

Substituents				React. temp. [°C]	Product	M. p. [°C]
R	R ¹	R ²	R ³			
C ₂ H ₅	H	H	CH ₃ -C ₆ H ₄	20	(2)	56–63
C ₂ H ₅	H	CH ₃	CH ₃ -C ₆ H ₄	20	(3) + (2)	—
C ₂ H ₅	H	C ₂ H ₅	CH ₃ -C ₆ H ₄	20	(2)	76–78
C ₂ H ₅	H	C ₂ H ₅	CH ₃ -C ₆ H ₄	80	(3)	—
C ₄ H ₉	H	H	CH ₃ -C ₆ H ₄	20	(2) + (3)	—
C ₂ H ₅	H	C ₂ H ₅	Cl	15–17	(3)	—
Dihydropyran			CH ₃ -C ₆ H ₄	20	(2) + (3)	65–70
Dihydropyran			CH ₃ -C ₆ H ₄	80	(3)	204–205
Dihydropyran			Cl	15–20	(3)	88–90

Formation of (2) or (3) depends on the substituents as well as on the reaction conditions. Viscous oils are often obtained when mixtures of (2) and (3) are formed, but (2) or (3) alone is almost always a crystalline compound. The characteristic carbonyl frequency for (2) lies between 1780 and 1800 cm⁻¹, for (3) between 1670 and 1730 cm⁻¹.

With sodium ethoxide, (2) gives salts of *N*-substituted β , β -dialkoxypropionamides (4), which form hydrazones with 2,4-dinitrophenylhydrazine.

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[1] H. Krzikalla, German Pat. 817 602 (Oct. 18th, 1951); R. Graf, Chem. Ber. 89, 1071 (1956).