

## The Tritylone Protecting Group: Ether Cleavage by Wolff-Kishner Reduction

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**Summary** Alcohols react readily with 9-phenyl-9-hydroxy-anthrone to form substituted trityl ethers which can be readily cleaved by a specific base-catalysed reaction, the Wolff-Kishner reduction.

TRITYL ethers are stable to a wide variety of reagents but are easily cleaved by dilute acid or by hydrogenolysis in neutral media.<sup>1,2</sup> The trityl group (I) can be easily attached to produce trityl ethers from most primary and

some secondary alcohols.<sup>2</sup> Because of these properties, the trityl group is one of the most important protecting groups for hydroxy-functions. As a complement to the trityl group it would be desirable to have a trityl derivative which could be cleaved under basic conditions. The general utility of such a derivative would be enhanced if the group were stable to the majority of base-catalysed reactions but could be cleaved by a specific one. The tritylone group (II) is such a group.

In principle, a trityl derivative such as (IV) should be cleaved by the Wolff-Kishner reduction.<sup>3,4</sup> The accepted mechanism<sup>5</sup> of that reaction involves conversion of the carbonyl carbon atom into a carbanionic centre, leading to elimination in cases where ketones have good leaving groups on the  $\alpha$ -carbon atom.<sup>6,7</sup> It was expected that a phenyl ring between the carbonyl carbon atom and the carbon atom bearing the leaving group would still permit elimination. Of the types of monocarbonyl systems (III) considered, the particular system (IV) would lead by elimination of  $OR^-$  to a stable by-product, 9-phenylanthracene (VI). In practice, this method is a very efficient one for cleaving tritylone ethers (IV). From the Wolff-Kishner reduction<sup>8</sup> of n-hexadecanyl tritylone ether, n-hexadecanol is recovered almost quantitatively and 9-phenylanthracene can be isolated in very good yield.

A desirable property for any protecting group is that it can be easily attached. Several methods for attaching the tritylone group have been studied. The ethers (Table)†

ROH	Yield of tritylone ether (%)	M.p. of ether (°C)
Hexadecanol ..	88	63—64
Dodecanol ..	86	53—54
Octan-2-ol ..	75	44—45
Cholesterol ..	59	204—206
Cyclohexanol ..	55	170—171

have been prepared using our best method. One equivalent of the alcohol and one equivalent of tritylone alcohol<sup>8,9</sup> are heated under reflux for 10—20 h in a  $C_6H_6$  solution containing a catalytic amount of toluene-*p*-sulphonic acid. Water, which distils over as the  $C_6H_6$  azeotrope, is collected in a Dean-Stark trap. The yields reported are based on the amount of pure ether isolated after chromatography on neutral alumina.

† All new compounds gave satisfactory analytical and spectral data.

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<sup>3</sup> Huang-Minlon, *J. Amer. Chem. Soc.*, 1946, **68**, 2487.

<sup>4</sup> D. Todd in "Organic Reactions", Wiley, New York, 1948, vol. 4.

<sup>5</sup> H. H. Szmant and M. N. Roman, *J. Amer. Chem. Soc.*, 1966, **88**, 4034, and references therein.

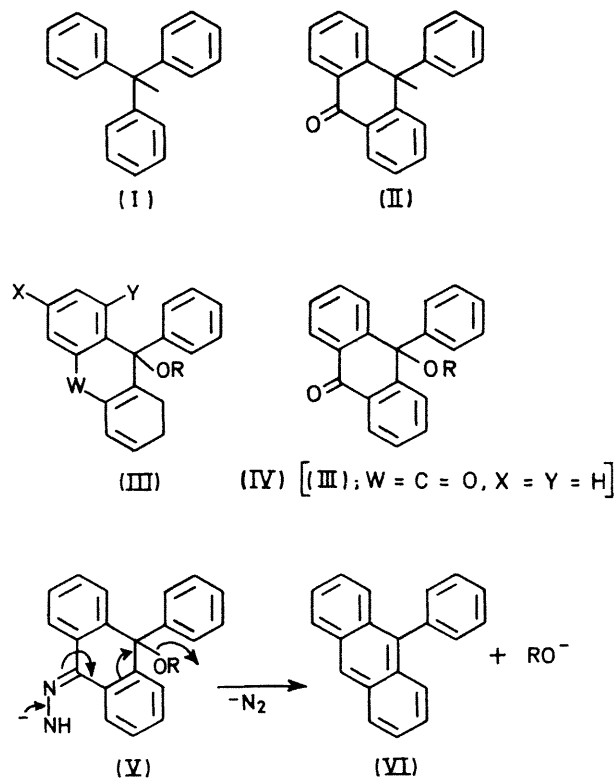
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<sup>7</sup> N. J. Leonard and S. Gelfand, *J. Amer. Chem. Soc.*, 1955, **77**, 3269.

<sup>8</sup> R. O. C. Norman and W. A. Waters, *J. Chem. Soc.*, 1958, 167.

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