

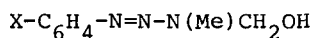
3,7-BIS-(4-TRIFLUOROMETHYLPHENYL)-1,5,3,7-DIOXADIAZOCINE:
A NOVEL CYCLIC PRODUCT FROM A REACTION OF 4-TRIFLUOROMETHYL-
BENZENEDIAZONIUM CHLORIDE AND METHYLAMINE-FORMALDEHYDE

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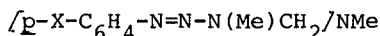
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Summary: 4-Substituted benzenediazonium chlorides react with methylamine-formaldehyde mixture at -5 to -10°C and controlled pH to afford the novel 3,7-bis-(4-X-aryl)-1,5,3,7-dioxadiazocines rather than the expected 1-(4-X-aryl)-3-hydroxymethyl-3-methyltriazenes or related dimeric products.

Although 1-aryl-3-hydroxymethyl-3-methyltriazenes have long been regarded as only transient molecular species, the synthesis of several stabilized forms has been achieved either by coupling of arenediazonium ions with methylamine-formaldehyde^{1,2} or by a condensation of 1-aryl-3-methyltriazene with formaldehyde³. Reaction of -M 4-substituted arenediazonium chlorides with methylamine-formaldehyde mixtures has been shown to afford not only the expected 1-aryl-3-hydroxymethyl-3-methyltriazenes (1) but also dimeric products, N,N-bis-(3-aryl-1-methyl-2-triazenylmethyl)methylamines (1,9-diaryl-3,5,7-trimethyl-1,2,3,5,7,8,9-hepta-azanona-1,8-dienes)^{4,5} (2).

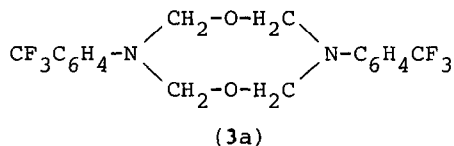


(1)



(2)

The product ratio (1) to (2) was sensitive to a) the substituent in the aryl group, b) temperature, c) the proportion of methylamine to formaldehyde, and d) pH of the reaction. As the latter seemed to be an important determinant for the reaction course, we have modulated pH at certain stages of the reaction sequence. We now find that coupling of 4-trifluoromethylbenzenediazonium chloride with methylamine-formaldehyde mixture under controlled temperature and pH affords the previously unreported 3,7-bis-(4-trifluoromethylphenyl)-1,5,3,7-dioxadiazocine (3a), a novel class of heterocycle.



In a typical synthesis 4-trifluoromethylaniline (4.03 g, 0.025 mol) in HCl (37%, 10 ml) and water (20 ml) was diazotised with NaNO₂ (2.76 g, 0.04 mol) and the clarified diazonium solution was coupled over 20 min with a premixed solution of methylamine (9 ml, 40%) and formaldehyde (40 ml, 37%), cooled to -5 to -10°C. After the addition had been completed, the reactants (pH 4-5) were mechanically stirred for 30 min and adjusted to pH 1 with HCl; stirring was continued for another 15 min after which the reaction mixture was placed in a refrigerator (4°C) overnight. The separated solid was isolated, washed with water and the dried product recrystallised from benzene (pale yellow crystals, m.p. 195°C, uncor; yield 0.9 g, 18%).

Analogous 3,7-bis-(4-X-aryl)-1,5,3,7-dioxadiazocines were prepared by a similar method (Table).

Table Physical data of 3,7-bis(4-X-aryl)-1,5,3,7-dioxadiazocines

Compound	X	Yield (%)	M.p. (t/°C)	Arom.		δ(¹ H n.m.r.) in CDCl ₃		M ⁺ m/z	I.r. (cm ⁻¹)
				(AA'BB')	J Hz	CH ₂	X		
(3a)	4-F ₃ C	18	195	6.92, 7.23	9	5.24	-	406 (15%)	1030
(3b)	4-CH ₃ OOC	49	217	6.90, 7.70	9	5.22	3.83 (6H,s)	386 (66%)	1035
(3c)	4-NC	50	227	6.89, 7.25	8.5-9	5.21	-	320 (17%)	1040
(3d)	4-O ₂ N	53	258	6.93, 7.81	9	5.28	(in d ₆ -DMSO)	360 (17%)	1035

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