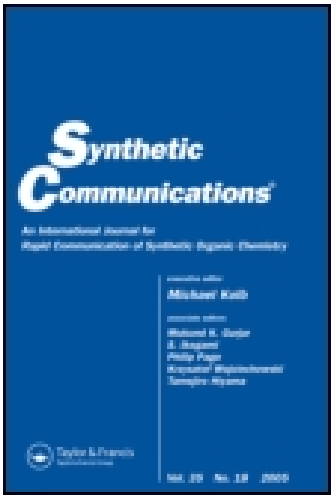

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Microwave-Mediated Debromination of *vicinal*-Dibromides

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Abstract: Debromination of *vicinal*-dibromides to E-alkenes is reported using inorganic solid supports (silica gel or acidic alumina) under microwave irradiation.

Keywords: Debromination, inorganic solid support, microwaves, stereoselective, *vic*-dibromides

The olefins can be regenerated from *vicinal*-dibromides with a variety of reagents[1] and the overall bromination/debromination process represents a means of protection and deprotection[2] of olefins. Our group has reported solvolytic stereoselective debromination of *vic*-dibromides by N,N-dimethylformamide (DMF)[3,4] and hexamethylphosphoramide (HMPA)[5] without the aid of any reagent. Different methods[6,7] reported in literature for debromination have their own advantages and disadvantages.

We report herein the first study on stereoselective debromination of *vic*-dibromides (I) adsorbed on inorganic solid support (silica gel or acidic alumina) under microwave irradiation[8] to give the corresponding E-olefins (II) (Fig. 1). Microwave-mediated debromination has been carried out on a variety of *vic*-dibromides (Table 1) within periods of 1–5 min.

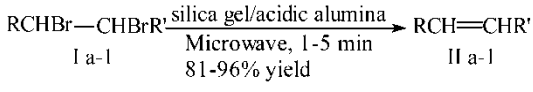

Figure 1. Debromination of vicinal-dibromides under microwave irradiation.

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Table 1. Reactions of *vic*-dibromides under microwave irradiation on inorganic solid support

S. No.	Substrates	Silica gel		Acidic alumina	
		Time (min)	Isolated yield (%) (**II**)	Time (min)	Isolated yield (%) (**II**)
1	*meso*-Stilbene dibromide (**Ia**)	2	95	2	96
2	*dl*-Stilbene dibromide (**Ib**)	2	84 (89)[a]	2	84 (91)[b]
3	*meso*-4-Chlorostilbene dibromide (**Ic**)	4	90	4	96
4	*meso*-4-Methylstilbene dibromide (**Id**)	3	91	3	95
5	*meso*-4,4′-Dichlorostilbene dibromide (**Ie**)	5	92	5	96
6	*meso*-4-Methoxystilbene dibromide (**If**)	1	82	1	86
7	*meso*-α,β-Dibromosuccinic acid (**Ig**)	1	96	1	98
8	*dl*-α,β-Dibromosuccinic acid (**Ih**)	1	95	1	98
9	*trans*-1,2-Dibromocyclooctane (**Ii**)	2	81	2	81
10	*trans*-1,2-Dibromocyclohexane (**Ij**)	10	84	10	85
11	Dihydrocinnamic acid dibromide (**Ik**)	—[c]	—	—[c]	—
12	Cholesterol dibromide (**Il**)	—[d]	—	—[d]	—
13	*meso*-Stilbene dichloride (**Im**)	2	21	2	37

[a]Yield in bracket is HPLC yield. 11% Z-stilbene was also formed.
[b]Yield in bracket is HPLC yield. 9% Z-stilbene was also formed.
[c]Starting material recovered.
[d]Decomposition of starting material was observed.

TYPICAL PROCEDURE

meso-Stilbene dibromide (0.5 g), dichloromethane (5 ml), and silica gel or acidic alumina (2 g) were mixed thoroughly in a beaker. The adsorbed material was dried and then exposed to microwave irradiation. After 2 min, the residue was extracted with ethyl acetate (3×10 ml). The combined ethyl acetate extract was dried over anhyd. $MgSO_4$, filtered, and concentrated to afford E-stilbene (0.25 g, 95%); mp 122°C, lit. mp[9] 124°C.

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