

0-Benzoylation of 1- and 2-Naphthols with Benzoyl Chloride under Phase Transfer Catalyst

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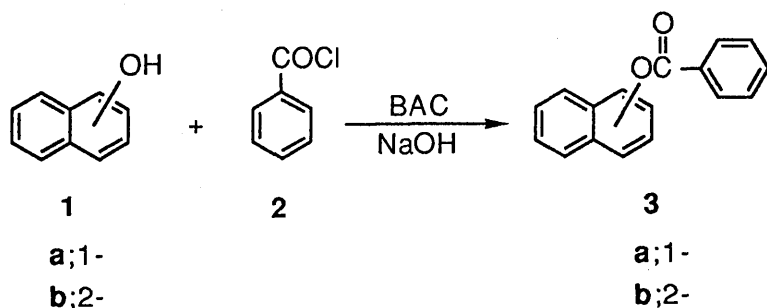
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The catalytic effects of phase transfer catalyst on the reaction of 1- and 2-naphthols with benzoyl chloride in a two phase system have been investigated. It was found that at low temperature 1-naphthyl and 2-naphthyl benzoates were obtained in good yield, respectively. However, the yields of the products decreased at high reaction temperature.

It has been previously reported¹⁾ that the reaction of phenol with benzoyl chloride is accelerated by use of tetra-butyl ammonium chloride (BAC) as phase transfer catalyst. We now wish to report BAC-catalyzed O-benzoylation of 1- (**1a**) and 2-naphthol (**1b**) with benzoyl chloride (**2**). The reaction of **1** and **2** was carried out under the various conditions (**Scheme 1**). The results are summarized in **Table 1**. As shown in the Table, when BAC was used as a catalyst the expected benzoates (**3a**) and (**3b**) were obtained in good yield at low temperature, respectively. On the contrary the yields of the products decreased at higher reaction temperature. These facts indicate that hydrolysis of the products occurred more easily at higher temperature rather than lower temperature in the presence of BAC catalyst.



Scheme 1

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Table 1 O-Benzoylation of Naphthols (**1a**, **1b**) with Benzoyl Chloride^{a)}

Run	Catalyst	Naphthol	Temperature (°C)	Yield (%)
1	non	1—	2	28
2	non	1—	15	40
3	non	1—	30	50
4	non	1—	40	52
5	non	1—	50	48
6	non	1—	60	46
7	non	1—	70	50
8	BAC	1—	2	51
9	BAC	1—	15	52
10	BAC	1—	30	54
11	BAC	1—	40	48
12	BAC	1—	50	39
13	BAC	1—	60	38
14	BAC	1—	70	37
15	non	2—	0	32
16	non	2—	10	36
17	non	2—	20	39
18	non	2—	30	42
19	non	2—	40	47
20	non	2—	50	45
21	non	2—	60	47
22	BAC	2—	0	71
23	BAC	2—	10	72
24	BAC	2—	20	72
25	BAC	2—	30	71
26	BAC	2—	40	72
27	BAC	2—	50	72
28	BAC	2—	60	68
29	BAC	2—	70	55
30	BAC	2—	80	42

a) Naphthols; 0.1mole, benzoyl chloride; 0.04mole, NaOH; as a 10% aqueous solution, 0.1mole, BAC; 123mmol.

Experimental Section

The benzoylation was carried out according to the method reported previously.¹⁾

References

- 1) I. Hashimoto, Y. Kotani and M. Doi, Memories of Wakayama national College of Technology, **25**, 85 (1990).