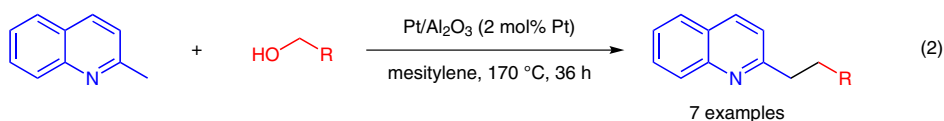
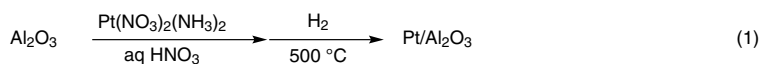


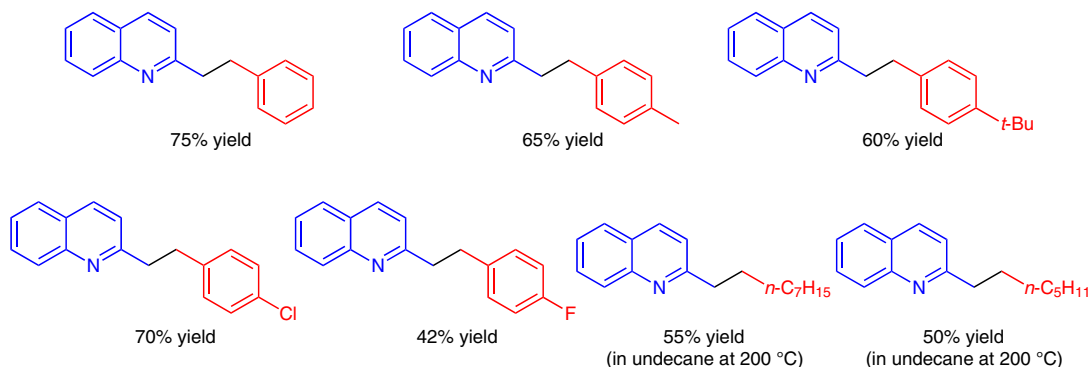
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Alkylation of 2-Methylquinoline with Alcohols under Additive-Free Conditions by  $\text{Al}_2\text{O}_3$ -Supported Pt Catalyst  
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## Dehydrative Alkylation of 2-Methylquinoline with Alcohols Using $\text{Pt}/\text{Al}_2\text{O}_3$



### Results:



**Significance:** The  $\text{Al}_2\text{O}_3$ -supported platinum nanoclusters ( $\text{Pt}/\text{Al}_2\text{O}_3$ ) were prepared by mixing  $\text{Al}_2\text{O}_3$  and an aqueous  $\text{HNO}_3$  solution of  $\text{Pt}(\text{NO}_3)_2(\text{NH}_3)_2$  followed by reduction with hydrogen (eq. 1).  $\text{Pt}/\text{Al}_2\text{O}_3$  catalyzed the dehydrative alkylation of 2-methylquinoline with alcohols in mesitylene. The alkylation took place at the 2-methyl group to afford the corresponding alkylated products in up to 75% yield (7 examples). The catalyst was recovered by centrifugation, reactivated by reduction with hydrogen and reused four times with a slight decrease of its catalytic activity.

**Comment:** The  $\text{Pt}/\text{Al}_2\text{O}_3$  nanoclusters were characterized by XANES, EXAFS and CO adsorption analyses. In the reaction of 2-methylquinoline with benzyl alcohol, the catalytic activity of  $\text{Pt}/\text{Al}_2\text{O}_3$  was superior to that of the other  $\text{Al}_2\text{O}_3$ -supported metal catalysts ( $\text{Ir}/\text{Al}_2\text{O}_3$ : 53% yield,  $\text{Rh}/\text{Al}_2\text{O}_3$ : 31% yield,  $\text{Pd}/\text{Al}_2\text{O}_3$ : 32% yield,  $\text{Ag}/\text{Al}_2\text{O}_3$ : 5% yield) and Pt nanoclusters supported on the other solid supports ( $\text{Pt}/\text{Nb}_2\text{O}_5$ : 20% yield,  $\text{Pt}/\text{C}$ : 7% yield,  $\text{Pt}/\text{ZrO}_2$ : 1% yield). ICP-AES analysis showed no leaching of Pt from the catalyst during the reaction.

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