

## Development and application of 2-azanorbornylmethanols as a cage type amino alcohol organocatalyst

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Cage type amino alcohol, with 2-azanorbornylmethanol frame-work **1**, is well known molecule and efficiently used as chiral ligand for organometallic catalyst.<sup>1)</sup> This amino alcohol (Fig. 1) has bulky 2-azanorbornane backbone, which contain nitrogen atom that need for the formation of enamine moiety. Furthermore, the molecule has a hydroxy group for a hydrogen bonding with a substrate as the side chain on the 2-azanorbornane backbone. Considering these abilities, it is expected that this type of amino alcohol might show an efficient functionality as an organocatalyst.

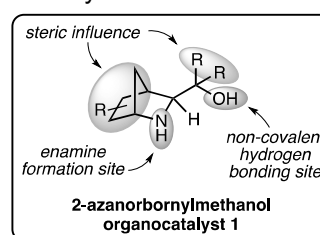
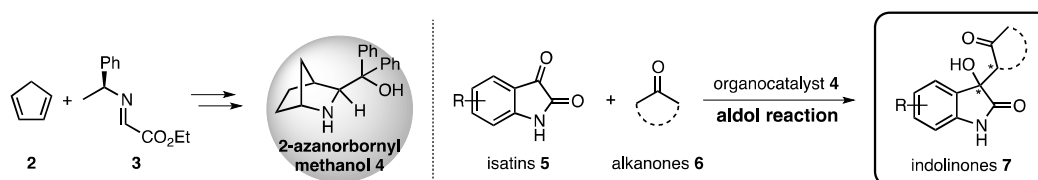


Fig. 1

2-azanorbornylmethanol **4**<sup>2)</sup> was designed and synthesised as a new chiral cage type amino alcohol organocatalyst, and the functionality as a catalyst was examined in the asymmetric aldol reactions of isatins **5** with alkanones **6** (Scheme 1).

We found that 2-azanorbornylmethanol **4** showed highly catalytic activity in the aldol reaction for affording chiral indolinones **7**.

This work will be presented and discussed in detail.



- 1) D. Guijarro, P. Pinho, P. G. Andersson, *J. Org. Chem.*, **1998**, *63*, 2530-2535.
- 2) H. Nakano, N. Kumagai, H. Matsuzaki, C. Kabuto, H. Hongo, *Tetrahedron: Asymmetry*, **1997**, *8*, 1391-1401.