

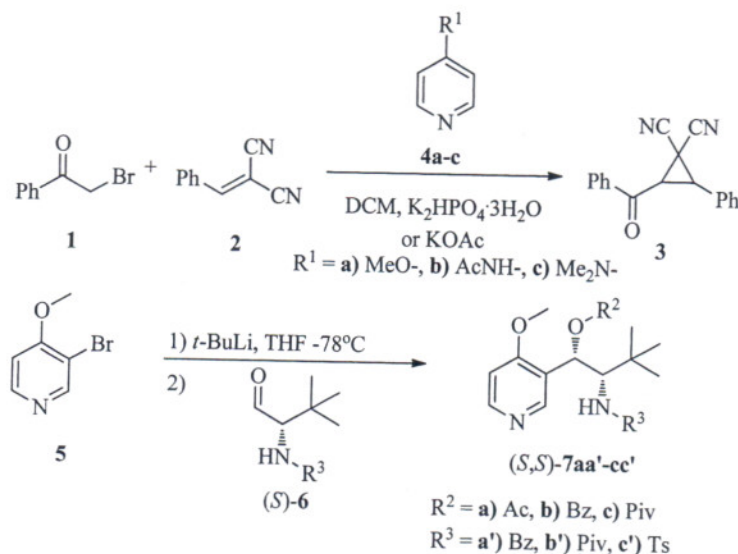
DESIGN OF CHIRAL PYRIDINES AS ORGANOCATALYSTS FOR ASYMMETRIC CYCLOPROPANATION REACTION

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Pyridine derivatives are widely used as organocatalysts and as ligands in transition metal catalysis. Herein we report synthesis and application of chiral pyridine organocatalysts in cyclopropanation reaction. To find suitable conditions for pyridine **4a-c** catalyzed cyclopropanation a range of solvents and bases was screened. It was found that the desired reaction proceeds smoothly without non-catalyzed background cyclopropanation reaction if $K_2HPO_4 \cdot 3H_2O$ or KOAc were used as base in dichloromethane.

Further investigation on pyridine derivative **4a-c** structure showed that electron donating groups in para-position accelerate cyclopropanation. Notably, 4-methoxypyridine (**4a**) and N-pyridin-4-ylacetamide (**4b**) showed the best yields (80% and 78%, respectively), whereas 4-dimethylaminopyridine (**4c**) gave only trace amounts of cyclopropane **3**.



Chiral organocatalysts (*S,S*)-**7aa'-cc'** were synthesized by ortho-lithiation of pyridine **5** followed by quenching with aldehydes (*S*)-**6a'-c'**.

When catalysts (*S,S*)-**7aa'-cc'** were employed in cyclopropanation reaction best enantioselectivities (48.8% ee) were achieved with sterically large substituent R^3 (Piv and Ts).