Effects of chiral modifiers on enantioselective hydrogenation of ethyl 2-oxo-4-phenylbutyrate over platinum catalysts

송병주, 김정명[1], 윤용주[1,†]
포항공과대학교; [1]POSTECH
(yjyun@postech.ac.kr[†])

Synthesis of enantiopure ethyl (R)-2-hydroxy-4-phenylbutyrate ((R)-EHPB), a key building block for angiotensin converting enzyme (ACE) inhibitors, is in interest of pharmaceutical industry. Among various synthetic methods, the heterogeneous hydrogenation of ethyl 2-oxo-4-phenylbutyrate (EOPB) to (R)-EHPB is advantageous in terms of high yield, reusability, and ease of separation. Here, we report the effects of chiral modifiers including cinchonine (CN), cinchonidine (CD), quinine (QN) and quinidine (QD) on the enantioselective hydrogenation of EOPB over platinum catalysts. Pt catalysts modified with CD and QN yield (R)-EHPB in excess. The opposite enantiomer was predominant with CN and QD. Under 1 bar H2 pressure, chirally modified Pt catalysts has higher reaction rate and enantioselectivity following the sequence: QN > QD ≈ CD > CN. At 50 bar H2 pressure, however, this sequence is changed to CD > CN > QN > QD. These results imply that the interaction between Pt surface and chiral modifiers plays a vital role in controlling the both reaction rate and enantioselectivity.