CATALYTIC ASYMMETRIC SYNTHESIS OF L-LYSINE

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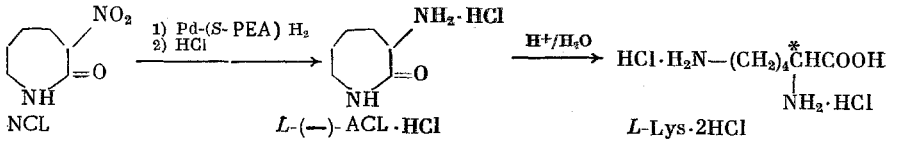
We have accomplished the asymmetric hydrogenation of 3-nitrocaprolactam (NCL) by the action of a chiral catalytic system containing $PdCl_2$ and S-α-phenylethylamine (PEA) previously used for the asymmetric reductive aminolysis of azlactones [1]. The hydrogenation using 1 mmole NCL, 0.18 mmole $PdCl_2$, 1.5 mmole amine, and 15 ml dimethoxyethane proceeds at about 20°C at atmospheric pressure over 5 h. Treatment with HCl gave the hydrochloride salt of (−)-3-aminocaprolactam (ACL•HCl) with an 11% excess of the L-(−) enantiomer, $[\alpha]_D^{20}$ −2.7° (C 5.2, 6 N HCl). Acid hydrolysis of this salt gave L-(+)-lysine•2HCl with the same optical purity



The hydrogenation of NCL, as described in a patent [2], in the presence of $Ru_2Cl_4[(-)\text{-DIOP}]_3$ at 75°C and 30 atm H_2 for 70 h gave (+)-ACL•HCl with $[\alpha]_D^{20}$ +10.3° and 39% excess of the optically active enantiomer and, after hydrolysis, to L-lysine•2HCl, mp 177-178°C (the excess of the optically active enantiomer was not indicated).

LITERATURE CITED

1. E. I. Karpeiskaya, L. F. Godunova, E. S. Neupokoeva, and E. I. Klabunovskii, Izv. Akad. Nauk SSSR, Ser. Khim., 1104 (1978).
2. European Patent No. 0083332 A2 (1983); Chem. Abstr., 99, 158860j (1983).

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