The use of lignin could be a green feedstock to produce building blocks for bulk and fine chemicals. Lignin is made-up of different substituted benzenes monomers, for which we take para-nitroaniline (PNA) as representation. In order to convert para-nitroaniline (PNA) to diaminocyclohexane (DACH) various catalysts were tested. Ruthenium dispersed on a niobium pentaoxide support showed the best results for this reaction. The reaction was carried out with 5% Ru/Nb2O5, using 15%(w/w) catalyst to reactant. While all the ruthenium catalysts showed conversion towards the product, the biggest selectivity towards the product was achieved with higher calcined niobia support. Since it was reported that the acidity of the niobia support is tunable by thermal treatment, the change in selectivity is associated with the reduced Brønsted acidity of the support. The ratio between the enantiomers suggest that the reactant coordinate under an incline to the catalyst. A mechanism of the hydrogenation reaction of PNA as well as a structure of the catalyst were proposed based on literature.