This object is achieved by a process according to Claim 1. Preferred developments of the invention are laid down in the dependent claims.

In a first aspect, there is provided a process for preparing low-odour n-butane by catalytically hydrogenating a starting mixture,

a) wherein the starting mixture comprises, in addition to n-butane, n-butene and carbon monoxide, at least one of the following components:
- up to 1% by mass of formic acid,
- up to 1% by mass of pentanals,
- up to 0.5% by mass of pentanols,

b) wherein the starting mixture is treated within the temperature range from 15 to 120°C with an aqueous solution of an alkali metal hydroxide or alkaline earth metal hydroxide within the concentration range from 0.5 to 30% by mass,

c) and wherein the starting mixture is subsequently subjected to catalytic hydrogenation.

The invention is therefore based on the finding that it is possible to prepare low-odour n-butane from a carbon monoxide-containing n-butane/n-butene mixture containing small amounts of formic acid and/or pentanals and/or pentanols by catalytic hydrogenation with hydrogen when the starting mixture before the hydrogenation is treated with an aqueous solution of an alkali metal hydroxide or alkaline earth metal hydroxide while maintaining the reaction parameters according to the claims. The treatment of the $C_4$ stream with alkali binds the formic acid as a salt. Pentanals form aldol addition or aldol condensation products. Pentanols remain dissolved in the alkali. Inventive treatment with alkali additionally also removes carbon monoxide from the starting mixture, and so damage to the catalyst in subsequent hydrogenation is avoided.

The process according to the invention also the following advantages on: the capital investment for an apparatus for removal of the troublesome components from the n-butane/n-butene mixture is low. The operating costs for this removal are small. The removal of the formic acid reduces the costs of the hydrogenation catalyst. Furthermore, the risk of corrosion by formic acid is reduced, and so inexpensive steels can be used for the construction of the plants downstream of the alkali wash, for example distillation columns, heat exchangers and hydrogenation plant.

The overall process for preparing for preparing the low-odour n-butane consists of the sequence of four process types, namely base extraction, dewatering by distillation, hydrogenation of the olefins and optional distillative removal of $C_5$ hydrocarbons. The present