Claims

[Claim 1] A hydrotreating catalyst for hydrocarbon oils comprising, at least one metal selected from the group 6 of the periodic table, at least one metal selected from the groups 8 to 10 of the periodic table, and optionally further phosphorus and/or boron as catalytic active components supported on an inorganic porous support based on alumina,

wherein the inorganic porous support comprises, as constituent components thereof, silica in an amount of less than 1% by mass with respect to the mass of the oxide and a metal of the group 4 of the periodic table in an amount of less than 13% by mass as an oxide; wherein the metal of the group 4 of the periodic table is highly dispersed in the inorganic porous support, a degree of dispersion thereof is shown by that no peak is substantially observed in the wave number range of 100 to 200 cm^{-1} by Raman spectroscopy, and that the composite oxide support has an absorption edge wavelength of the absorption peak derived from the group 4 metal of the periodic table measured by ultraviolet spectroscopy (the maximum wavelength in which a spectral intensity value (K-M value) after Kubelka-Munk conversion is 0.3 or higher) at 350 nm or less and the maximum wavelength at 323 nm or less in which the K-M value is 1.5 or less and no crystal is substantially observed by X-ray diffraction analysis;

wherein the hydrotreating catalyst has a specific surface area of 100 to 300 m^2/g, a pore volume of 0.2 to 0.5 ml/g, an average pore diameter of 6 to 10 nm, wherein the volume of the pores with their diameters kept in a range of between the average pore diameter +1 nm and -1 nm accounts for 50 to 90% of the total pore volume, and wherein a NO adsorption amount of 4.5 cm^3/ml or more as catalytic characteristics; and wherein no crystals derived from the metal oxide salts of the group 6 of the periodic table are substantially observed by X-ray diffraction analysis.

[Claim 2] The hydrotreating catalyst according to claim 1, wherein the supported amount of the metal selected from the group 6 of the periodic table is 15 to 30% by mass and the supported amount of the metal selected from the groups 8 to 10 of the periodic table is 0.5 to 5% by mass based on the catalyst oxide.

[Claim 3] The hydrotreating catalyst according to claim 1 or 2, comprising 0.5 to 5% by mass of phosphorus and/or boron based on the catalyst oxide.

[Claim 4] A hydrotreating method of hydrocarbon oils, wherein the hydrogenation catalyst disclosed in any one of claims 1 to 3 is brought into contact with a hydrocarbon oil under conditions of a reaction temperature of 300 to 450°C, a hydrogen partial pressure of 1 to 20 MPa, a liquid hourly space velocity of 0.1 to 10 hr^{-1}, and a hydrogen/oil ratio of 50 to 1,200 Nm^3/kl.