Title (en)

METHOD FOR THE HETEROGENEOUSLY CATALYZED PARTIAL GAS PHASE OXIDATION OF PROPENE INTO ACRYLIC ACID

Title (de)

VERFAHREN DER HETEROGEN KATALYSIERTEN PARTIELLEN GASPHASENOXIDATION VON PROPEN ZU ACRYLSÄURE

Title (fr)

PROCEDE D'OXYDATION EN PHASE GAZEUSE PARTIELLE, HETEROGENE ET CATALYSE DU PROPENE EN ACIDE ACRYLIQUE

Publication

EP 1611078 A2 20060104 (DE)

Application

EP 04722163 A 20040320

Priority

- EP 2004002931 W 20040320
- DE 10313209 A 20030325

Abstract (en)

[origin: DE10313209A1] A process for the heterogeneously catalyzed partial gas phase oxidation of propene to acrylic acid by passage of a gas phase mixture comprising 6-15 vol.% propene, 4-20 vol. % water and no greater than 10 vol. % of other components as well as molecular oxygen such that the molar ratio of oxygen to propene is 1.5-2.5 and the residual amount to 100 vol.% comprises molecular nitrogen though a first reaction stage. A process for the heterogeneously catalyzed partial gas phase oxidation of propene to acrylic acid by passage of a gas phase mixture (I) comprising propene, molecular oxygen and at least one inert gas having a molar ratio of oxygen to propene of at least 1. The process involves a first reaction stage at elevated temperature having a fixed catalyst bed of ring shaped catalyst having a multimetal oxide active material of formula (1). The catalyst has a volume specific activity in the flow direction of the mixture (I) which is either constant or at least increases once and the active mass composition does not change over the bed packing such that the conversion of propene is at last 90 mol.% in a single pass with a selectivity to acrolein and acrylic acid of at least 90 mol.% with direct or indirect cooling of the product mixture leaving the first reaction stage. Optional addition of molecular oxygen and/or inert gas and the product mixture comprising acrolein, molecular oxygen and at least one inert gas having a molar ratio of oxygen to acrolein of at least 0.5 is passed through a second reaction stage comprising a second fixed bed catalyst packing comprising ring shaped packing whose active mass comprises a multimetal oxide of formula (2). Multimetal oxide (2) whose volume specific activity in the direction of flow at least increases once and whose composition does not alter over the second reaction stage such that the single-pass conversion of acrolein is at least 90 mol.% and the selectivity of both reaction stages to the formation of acrylic acid (with respect to reacted propene) is at least 80 mol.% is characterized in that the reaction mixture (I) comprises 6-15 vol.% propene, 4-20 vol.% water and no greater than 10 vol. % of other components that are not propene, water, oxygen or nitrogen, as well as molecular oxygen such that the molar ratio of oxygen to propene is 1.5-2.5 and the residual amount to 100 vol.% comprises molecular nitrogen. Mo12X1aX2bX3cX4dX5eOn (1) Mo12VfX6gX7hOm (2) X1 = Bi, Co or Ni; X2 = W or Nb; X3 = Fe or Cr; X4 = K, Cs or Sr; X5 = Si, Al or Zr; X6 = W or Nb; X7 = Sb, Cu, Ni or Fe; a = 5-10; b = 0-4; c = 2-5; d = 0.02-0.15; e = 0.5-4; f = 1-5; g = 1-2; h = 1-4; m, n = number of O atoms dependent upon the valency and number of elements.

IPC 1-7

C07C 57/05

IPC 8 full level

C07C 51/25 (2006.01)

CPC (source: BR EP KR US)

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Citation (search report)

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