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Abstract



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The invention relates to a process for preparing unsaturated nitriles from the corresponding alkanes which comprises the steps:

- a) feeding an alkane into a dehydrogenation zone and catalytically dehydrogenating the alkane to the corresponding alkene to obtain a product gas stream A which comprises the alkene, unconverted alkane and possibly one or more further gas components selected from the group consisting of steam, hydrogen, carbon oxides, hydrocarbons having a lower boiling point than the alkane or the alkene (low-boilers), nitrogen and noble gases,
- b) at least partially removing further gas components from the product gas stream A to give a feed gas stream B which comprises the alkane and the alkene,
- c) feeding the feed gas stream B, ammonia, an oxygen-containing gas and, if desired, steam into an oxidation zone and catalytically ammoxidizing the alkene to the corresponding unsaturated nitrile to give a product gas stream C which comprises the unsaturated nitrile, ammoxidation by-products, unconverted alkane and alkene and possibly one or more further gas components selected from the group consisting of steam, oxygen, carbon oxides, ammonia, nitrogen and noble gases,
- d) optionally removing ammonia from the product gas stream C to give an ammonia-depleted product gas stream D,
- e) removing the unsaturated nitrile and ammoxidation by-products from the product gas stream C or D by absorption in an aqueous absorbent to give a gas stream E which comprises unconverted alkane and alkene and possibly one or more further gas components selected from the group consisting of oxygen, carbon oxides, ammonia, nitrogen and noble gases, and an aqueous stream which comprises the nitrile and the

by-products, and recovery of the unsaturated nitrile from the aqueous stream,

- f) recycling the gas stream E into the dehydrogenation zone.