

Title (en)  
Heat treatment of metals.

Title (de)  
Wärmebehandlung von Metallen.

Title (fr)  
Traitement thermique des métaux.

Publication  
**EP 0404496 A1 19901227 (EN)**

Application  
**EP 90306645 A 19900619**

Priority  
GB 8914366 A 19890622

Abstract (en)  
A metal less readily oxidisable than iron is annealed in an atmosphere that is formed by separating (in for example a pressure swing adsorption apparatus 2) nitrogen from air to form a gas mixture comprising at least 95% by volume of nitrogen and a minor proportion of oxygen impurity, and then reacting the oxygen impurity with hydrogen in a catalytic reactor 4. The resulting atmosphere, which is admitted to an annealing furnace 6, comprises nitrogen, hydrogen and water vapour.

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**C21D 1/76**; **C22F 1/02**

IPC 8 full level  
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CPC (source: EP KR)  
**C21D 1/26** (2013.01 - KR); **C21D 1/763** (2013.01 - EP); **C22F 1/02** (2013.01 - EP)

Citation (search report)

- [A] US 3535074 A 19701020 - NAKASHIMA FUMITO
- [A] EP 0266745 A2 19880511 - AIR PROD & CHEM [US]
- [A] FR 2306936 A1 19761105 - AZOTE & PROD CHIM [FR]
- [A] US 4398971 A 19830816 - PETERSON RUNE [SE]
- [XP] FR 2639252 A1 19900525 - AIR LIQUIDE [FR]
- [XP] FR 2639250 A1 19900525 - AIR LIQUIDE [FR]
- [A] PATENT ABSTRACTS OF JAPAN, vol. 13, no. 156 (C-585)[3504], 14th April 1989; & JP-A-63 310 915 (DAIDO STEEL CO., LTD) 19-12-1988
- [A] ADVANCED MATERIALS & PROCESSES, vol. 134, no. 3, September 1988, pages 100,102,104,107, Metals Park, Ohio, US; W.C. QUANTZ: "Stealing nitrogen from the air"

Cited by  
US5320818A; US5401339A; US5290480A; US5284526A; US5417774A; EP0603799A3

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BE DE ES FR GB IT NL SE

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