

**Integration of Nuclear Energy and Chemical Production:
High-Temperature Gas-Cooled Reactor for Chemical Syntheses
of Hydrogen, Oxygen, Methanol and Hydrocarbons**

Heinrich KLEFFENZ

RTM Resources + Technologies – Management
HTC-RTM High-Technology-Centre – RTM
D-76879 Bornheim
Germany

April 17, 2007

Oarai, JAPAN

Dr. Heinrich Kleffenz □ **RTM Resources + Technologies – Management** **Hauptstr. 35** □ **D76879 Bornheim** □ **GERMANY**
Tel: (+49) (0)6348 1289 □ **Fax: (+49) (0)6348 959 872** □ **e-mail: info@rtm-hkl.com** □ **Mobile : (+49) (0)175 24 29 032**

Contents:

Introduction

Water Dissociation

Hydrogen and Oxygen Separation

Carbon Dioxide Separation

Chemical Syntheses with Hydrogen

Hydrocarbon Syntheses

Oxygen

Nuclear Hydrogen

HTGCR and Energy / Hydrogen

Dr. Heinrich Klefenz □ RTM Resources + Technologies – Management Hauptstr. 35 □ D76879 Bornheim □ GERMANY

Tel: (++49) (0)6348 1289 □ Fax: (++49) (0)6348 959 872 □ e-mail: info@rtm-hkl.com □ Mobile : (++49) (0)175 24 29 032

Introduction

- Nuclear Energy is a Non-Fossil Source of Energy
- HTGCR (High-Temperature Gas-Cooled Reactor) provides Thermal Energy at ~ 1000 °C
- HTGCR ('pebble-bed reactor') is inherently safe
- Uranium Resources are a long-term (uranium ores, sea water) Energy Source
- High Temperature Heat suitable for Endothermic Chemical Syntheses
- Combination of Nuclear Energy with Chemical Syntheses provides Energy & Hydrocarbons & Materials

Dr. Heinrich Klefenz □ RTM Resources + Technologies – Management Hauptstr. 35 □ D-76879 Bornheim □ GERMANY

Tel: (++49) (0)6348 1289 □ Fax: (++49) (0)6348 959 872 □ e-mail: info@rtm-hkl.com □ Mobile : (++49) (0)175 24 29 032

Water Dissociation

Reaction:

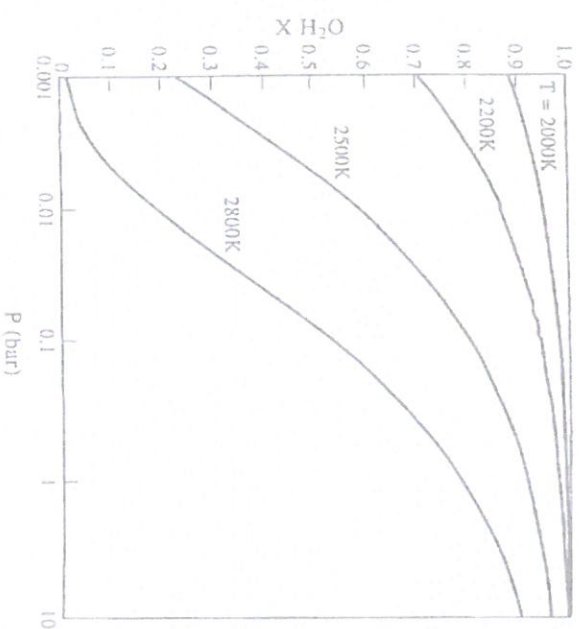


Production of

- 100.000 tons of Hydrogen and
 - 800.000 tons of Oxygen
- requires input of
- 900.000 tons of water and
 - 3×10^{12} kcal = 3.5×10^9 kWh = 3.5×10^3 GWh

Dr. Heinrich Klefenz □ RTM Resources + Technologies–Management Hauptstr. 35 □ D76879 Bornheim □ GERMANY

Tel: (++49) (0)6348 1289 □ Fax: (++49) (0)6348 959 872 □ e-mail: info@rtm-hkl.com □ Mobile : (++49) (0)175 24 29 032



Dr. Heinrich Kiefenz □ RTM Resources + Technologies – Management Hauptstr. 35 □ D76879 Bornheim □ GERMANY

Tel: (++49) (0)6348 1289 □ Fax: (++49) (0)6348 959 872 □ e-mail: info@rtm-hkl.com □ Mobile: (++49) (0)175 24 29 032