



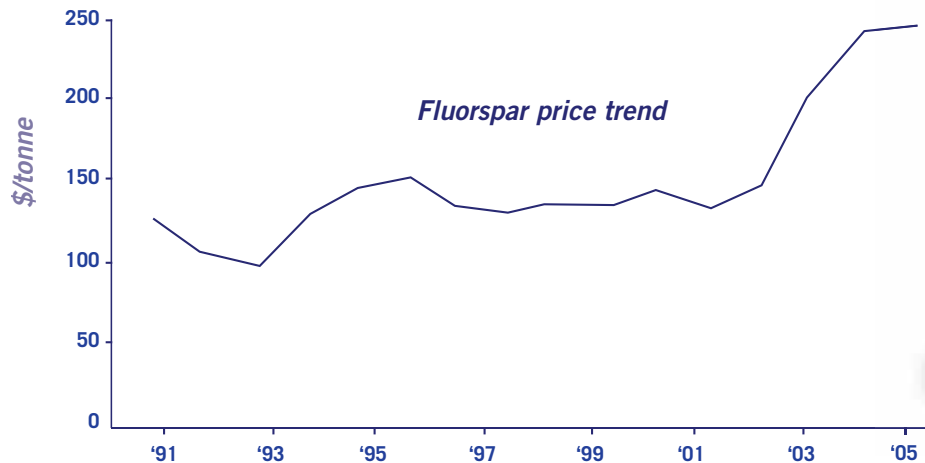
fluorochemical excellence
shaping the future

**The South African
Fluorochemical Expansion
Initiative (FEI)**



Introduction

Globally the \$16 billion fluorochemical industry is shifting new production toward the source of the raw material, fluorspar (CaF_2), a movement aggressively led by China and which has resulted in a dramatic increase in fluorspar prices driven by tightening supply.



South African Fluorspar

South Africa is blessed with large, rich and diverse deposits of fluorspar and is positioning itself to increase beneficiation within the country to serve the rapidly growing local and regional markets, and for export purposes.

South African Fluorspar producers

MINE	WITKOP	VERGENOEG
OWNER	Sallies	Meterox
LOCATION	Zeerust, Northern Province	Rus de Winter, North-West Province
RESERVES	19 Million tons @ 39% CaF_2	35 Million tons @ 15% CaF_2
RESOURCES	208 Million tons @ 23% CaF_2	53 Million tons @ 14% CaF_2
PRODUCTION (acid grade)	100,000 tons per annum	180,000 tons per annum

South African Fluorspar deposits



Other smaller fluorspar mines are in operation and plans are in place to expand current operations and to start new explorations.

South African Competitiveness

There are a number of competitive advantages that South Africa has over other countries and relevant to fluorochemicals are the following:

- South Africa is the third largest producer of fluorspar in the world at 260,000 tons/year.
- South Africa has the second largest fluorspar reserves on the globe at 80 million metric tons.
- Lifetime of the resource is over 300 years at the current production rate.
- Cost effective heating is available in the form of coal vs. crude/heavy oil.
- South Africa has the second most cost effective electricity worldwide.

Fluorochemical Technology Platforms

The following technology platforms have been developed during the last 20 years:

- HF Production Technologies
- Fluorine Production Technology
- Direct Fluorination of:
 - Inorganic Materials
 - Organic Materials
- Thermal Conversion of Fluorocarbons
- Separation and Purification
- Fluorochemical Industrialization
- Fluorochemical Analytical Techniques



Current Fluorochemical Activity

The current fluorochemical activity in South Africa is listed here. Many of these activities are done in collaboration and partnership with leading international players. South African fluorochemical products are used in nearly every developed country in all continents.

Markets supplied are, amongst others: semiconductor, solar, micro electromechanical systems (MEMs), steel, petrochemical, glass, automotive, agriculture and aluminium.

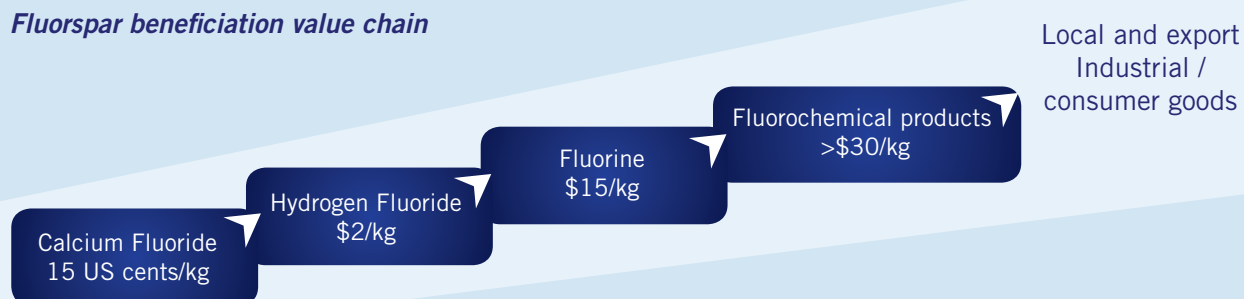
Current Fluorochemical activities

FACILITY	OWNER
Hydrogen Fluoride (HF) plant	Pelchem
Fluoride Salt (NaF.HF) plants	Pelchem
Surface fluorination plant	Fluoro Pack
Fluorine (F ₂) plant	Pelchem
Tungsten Hexafluoride (WF ₆) plant	Pelchem
Nitrogen Trifluoride (NF ₃) plant	Pelchem
Fluoroelastomer (Precursor)	Pelchem
Xenon Difluoride (XeF ₂) plant	Pelchem
Hydrogen Fluoride & Aluminium Trifluoride (AlF ₃)	Alfluorco
Fluorochemical chair: <i>Fluoro-materials Science & Process Integration</i>	University of Pretoria (UP)
Fluorochemical chair: <i>Fluorine Process Engineering and Separation Technology</i>	University of KwaZulu-Natal (UKZN)

Fluorochemical Expansion Initiative

Currently, around 95% of South Africa's acid grade fluorspar production is exported and the remaining 5% is beneficiated to crude and pure HF and other fluorochemical products. Although South Africa supplies 5% of the fluoride source for the \$16 billion global fluorochemical industry, it earns less than 0.5% of its value. The Fluorochemical Expansion Initiative (FEI) attempts to redress this deficiency through the establishment of value-adding world-class fluorochemical industries in South Africa.

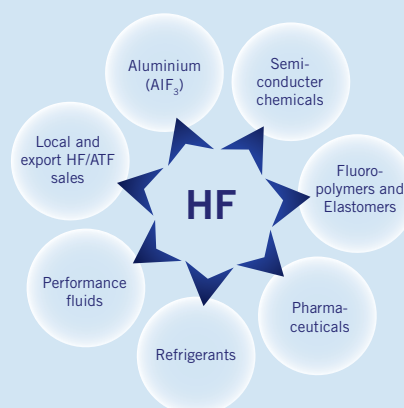
Fluorspar beneficiation value chain



South Africa's intent for FEI is to:

- Facilitate growth of the local fluorochemical industry by establishing world-class and high-value fluorochemical production facilities in the country.
- Attract foreign investments and partnerships.
- Create a "critical mass" of:
 - Qualified and experienced people to support the growing fluorochemical industry
 - Industrial support for specialised equipment and material
 - Upstream raw material for conversion to high value products.
- Pursue short to medium term fluorochemical opportunities pursued are refrigerants, performance fluids and fluoropolymers / fluoroelastomers.
- Pursue longer term opportunities, including: pharmaceuticals, radioisotopes and anesthetics.

South African fluorochemical cluster vision



The South African Fluorochemical Expansion Initiative is supported by:



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