INNOVINNPROM

Industrial automation

- ✓ Thirty years of experience in complex automation of enterprises
- ✓ The full cycle of automation - from design to commissioning
- ✓ Exclusively proven industrial solutions
- ✓ Own SAKURA-IIoT cloud software platform
- ✓ Experience in the development and implementation of hi-tech systems

Project
Organization of Sapphire Manufacturing

Vinnytsia - 2023

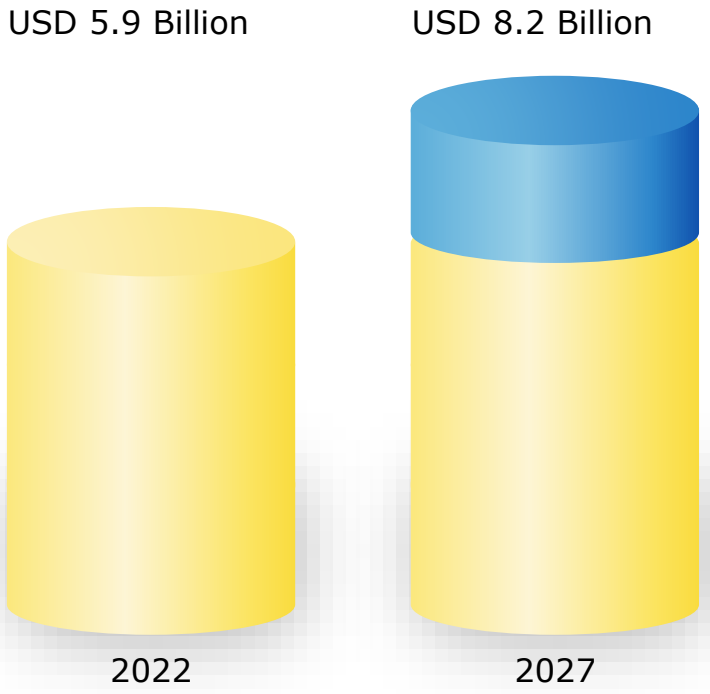
Global Synthetic Saphire Market

According to the research data of the global market intelligence and consulting organization, further significant growth of the artificial sapphire market is predicted. At the same time, the withdrawal from the global market of Russian manufacturers of artificial crystals and, probably, Chinese ones is predicted.

Main global players in this field are:

Rubicon Technology (US)
Sapphire Technology Company (China)
Monocrystal (Taiwan, in fact russian company)
Thermal Technology (US)
CrystalTech HK (China)
Namiki Precision Jewel (Japan)
IntElorg Pte (Singapore)
Shanghai Daheng Optics & Fine Mechanics (China)
SF Tech (US)
Omega-crystals (US)
GT Advanced Technologies (US)
Kyocera (Japan)
Advanced Renewable Energy Company (US)

Market forecast to grow at a GAGR of 6.6%



Public data of SkyQuest Technology Group

This opens up great opportunities for Ukraine to restore the field of artificial crystal production, as Ukraine owns and develops technologies for growing artificial crystals, has the appropriate scientific and technical personnel, and manufactures equipment for growing artificial crystals.

Application of Sapphire Crystals

Security

Protection

Physics

Exploration

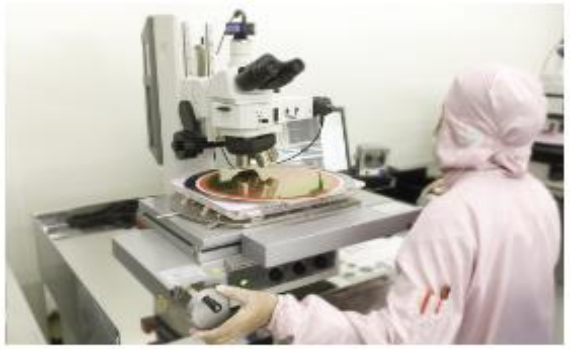
Aerospace

Safety

Gauging

Analysis

Environment



Industrial

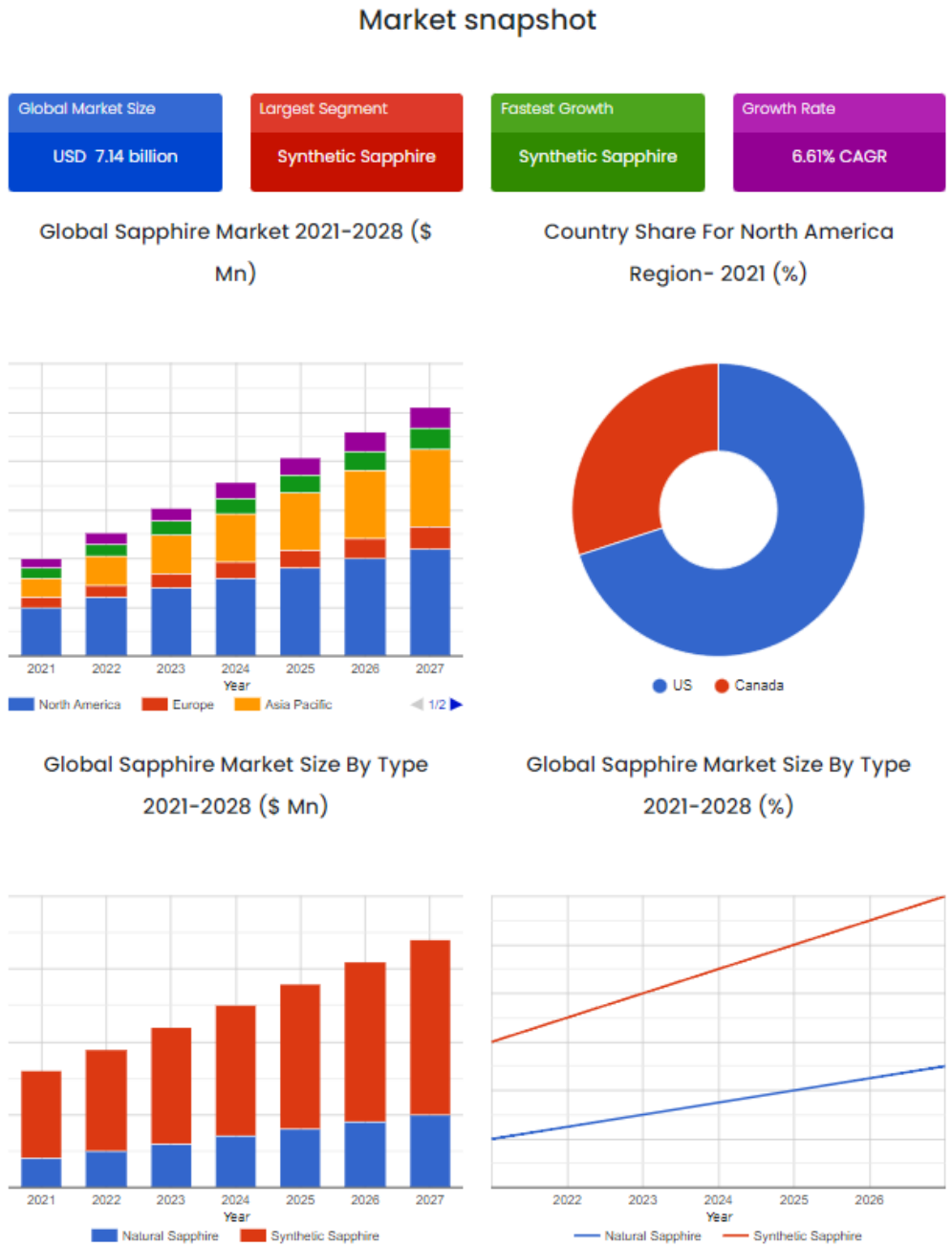
Research

Medical

Sapphire Market Driver

The sapphire market growth is primarily being driven by the rise in utilization in sectors including IT and communications, power, aerospace, and defense. Due to its excellent qualities, it is about to become a successful substance in semiconductors. The rising use of sapphire in RF applications and power electronics is also estimated to spur additional growth in the sapphire industry.

Numerous optical applications in the healthcare sector utilize sapphire. It is used for its robustness and optically clean hermetic characteristics. Applications for sapphire include tomography and co2 laser surgery equipment. Other uses include aiding in the production of orthopedic implants, scalpels, and optical probes. Because of its mechanical toughness, sapphire can tolerate blood as well as substances like chlorine and fluorine. Thus, the market expanded as a result of its many benefits, including hardness, optical transparency, strength, and chemical inertness.



The Essence and Purpose of the Project

Goals and Objectives:

The main objective is to establish the manufacturing and production of sapphire products in Ukraine, to enter the world market and gain 10 % niche of world sapphire production.

The main activities.

- Production and distribution of synthetic sapphire for high-tech industries
- Production of various sapphire elements and sales

It is proposed to grow sapphire crystals and to cut plates from them for wide range of possible usage. It is planned to manufacture boules, cores sapphire and sapphire plates. Manufacturing focus will depend on the market conjuncture.

The overall cost of the project amounts to $44 mln for 5 years. Necessary investments about $20 mln depending on global market pricing. Investments will be returned in the beginning of 5-6 years.

Profits generated in the initial stage will be poured to pay the investments with interests and then on the expansion and development of the manufacturing.

Investments

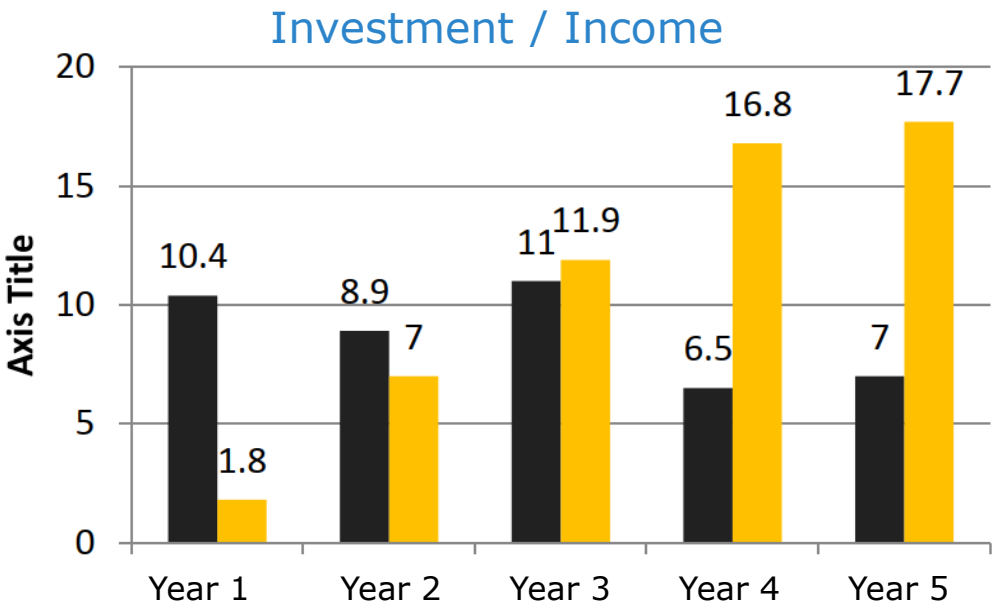
The chart below shows the investments in relation to incomes by years. It is obvious from the chart that starting from the year 4 the income will exceed investments more than twice, in the meantime investments will be fully returned.

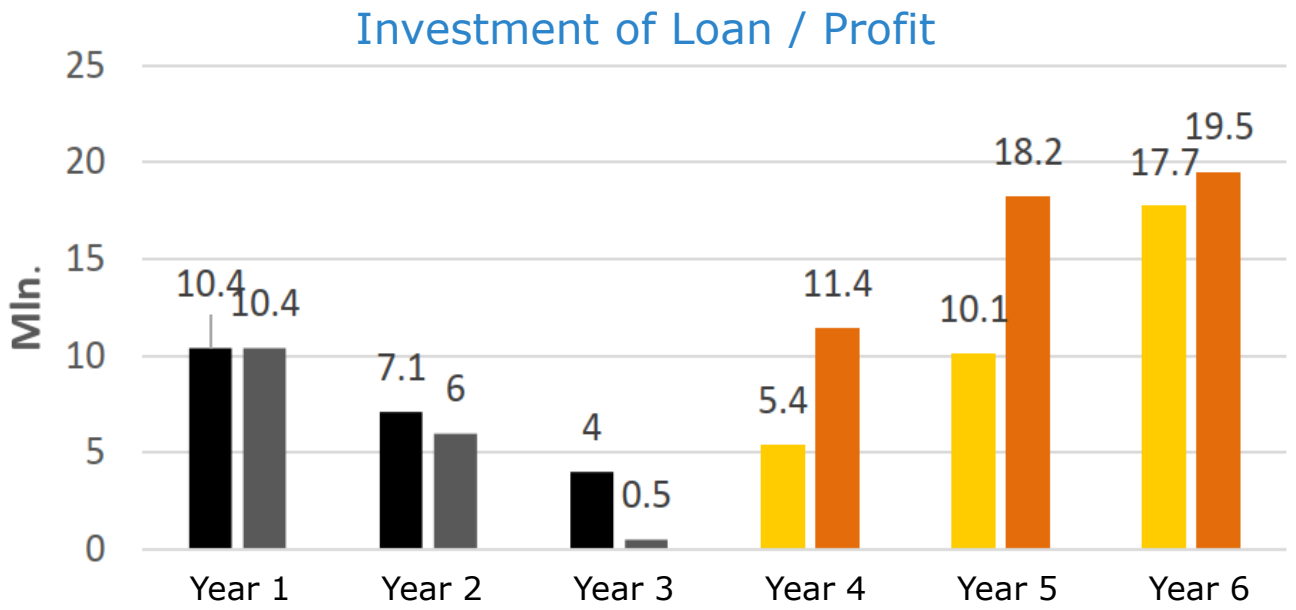
The increase of income over the investments is significant and this is made for the worst case scenario when the set product prices are way below the market price in the worst consumption environment. With the market situation improving the given numbers will be outrun too.

If the income is reinvested in the manufacturing process then investment return can start from 4th year and be finished at the beginning of 6th year after the product sales are accomplished. In case of the considered selling price of $400/kg the investments amount to $21,5mln. In case if the selling price is$600/kg the investments accordingly amount to 16,9mln and can be returned at the end of the 5th year.

I.e. the project price is $44mln and the necessary investments are $21,5mln or approximately $7mln in case of $600/kg sales. The chart below shows the investment/loan return dynamics. The left side columns show the sales prices of the sapphire $400/kg and $600/kg.

I.e. $600/kg will require $16,9mln investments and they will be returned at the end of the fifth year. In any case the investment will be directed only for the purchase of the equipment.





Production of Growing Equipment in Ukraine

Within the framework of cooperation between Ukrainian companies and scientific organizations (State Scientific Institution "Institute for Single Crystals" of the National Academy of Sciences of Ukraine), equipment for growing crystals using the following methods is developed and mass-produced:

- Equipment for growing crystals of synthetic corundum by the method of solidification in the horizontal direction
  (The photo below shows the equipment that was exported to China)
- Equipment for growing crystals of synthetic corundum by the Kyropoulos method.

In Ukraine, there are still highly qualified specialists - scientists and technologists who are capable of restoring lost production and scaling up the production of their own growing plants

Crystal Growing Management Systems INNOVINPROM

Омега DM300
Омега PG350

Delta-K

PromCrystal-S2

Lost Production in Drohobych, Ukraine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Industry 4.0