



SARV

IMS AGS



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۱۳۸۳ شرکت توسعه صنایع
نفت و گاز سرو
OIL & GAS پیشگام تولید کاتالیست صنایع فولاد، پتروشیمی و پالایش
INDUSTRIES DEVELOPMENT CO.



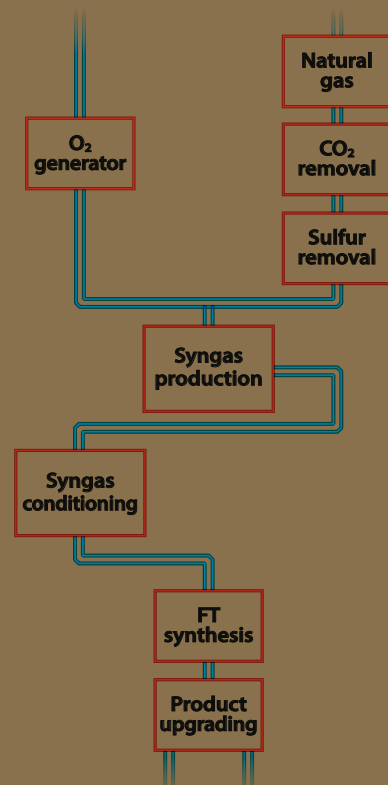


نفت و گاز سرو

شرکت دانش بنیان توسعه صنایع نفت و گاز سرو اولین و بزرگترین تولید کننده کاتالیست‌های صنایع فولاد، پالایش و پتروشیمی و نیز اولین دارنده دانش فنی واحدهای GTL در کشور می‌باشد. این شرکت با حدود دو دهه تلاش مستمر توسط دانشمندان و متخصصان ایرانی توانسته است با تولید کاتالیست‌های صنایع نفت، گاز، پتروشیمی و فولاد، نام ایران را بر صنعت پیشرفته تولید کاتالیست در دنیا حک نماید. محصولات این شرکت از کیفیت رقابتی نسبت به نمونه مشابه خارجی برخوردار بوده و به گواه تاییدیه‌های اخذ شده از مراجع معتبر و مصرف‌کنندگان، در مقایسه برخی پارامترها، از عملکرد مطلوب‌تری برخوردار می‌باشند. کاتالیست‌های تولیدی این شرکت به دو بخش کاتالیست‌های مورد نیاز صنایع نفت، گاز و پتروشیمی و کاتالیست‌های صنایع فولاد تقسیم می‌گردند.

تکنولوژی GTL

شرکت نفت و گاز سرو به منظور دستیابی به تکنولوژی تبدیل گاز طبیعی به میعانات نفتی یا GTL با تکیه بر تیم تخصصی فنی و با انجام تحقیقات گسترده موفق به کسب این دانش فنی گردیده است. در همین راستا پایلوت تولید یک تا سه بشکه میعانات نفتی در روز در کارخانه این شرکت راه اندازی گردیده است. این فرآیند دارای مزایای فراوانی بوده که از آن جمله می‌توان به محصول نفتی (بنزین، دیزل و...) بدون سولفور اشاره نمود.





Micromeritics chemisorb 2750



Atomic Absorption Spectrometer
(GBC 906AA)



Tristar II 3020 Surface Area Analyzer



GC-Mass Spectrometry



سامانه آزمون عملکرد راکتوری کاتالیست

مرکز تخصصی تحقیقات کاتالیست

شرکت توسعه صنایع نفت و گاز سرو با سالها تحقیقات مستمر علمی و با بهره‌مندی از توان متخصصان صنعت کاتالیست، مجموعه آزمایشگاه تحقیقات کاتالیست را با پیشرفته‌ترین تجهیزات آزمایشگاهی تاسیس نموده است. این مرکز با دارا بودن نیروی متخصص علمی و تحقیقاتی و نیز با در اختیار داشتن مجموعه مدرن و پیشرفته تجهیزات آزمایشگاهی، آمادگی دارد تا علاوه بر پشتیبانی از خط تولید این شرکت و تدوین دانش فنی کاتالیست‌های جدید، کلیه خدمات تخصصی مرتبط با انواع کاتالیست در اختیار مجتمع‌های فولاد، پتروشیمی، پالایشگاه، دانشگاه و سایر واحدهای تحقیقاتی قرار دهد.



سبد محصولات

شرکت دانش بنیان نفت و گاز سرو به عنوان یک شرکت ایرانی پیشرو موفق گردیده است طیف وسیعی از کاتالیست های مورد نیاز صنایع مختلف را به تولید برساند. دانش فنی تولید صنعتی تمامی این محصولات بر اساس دانش متخصصان این شرکت در مرکز تخصصی تحقیقات کاتالیست تدوین گردیده است. محصولات شرکت عمدتاً نیازهای صنایع زیر را هدف قرار داده است:

- واحدهای احیاء مستقیم آهن
- واحدهای تولید کننده آمونیاک و اوره
- واحدهای تولید کننده متانول
- واحدهای تولید کننده هیدروژن و گاز سنتز
- واحدهای الفین
- کاتالیست های با فاز فعال فلزات گرانبها برای واحدهای پالایش نفت
- واحدهای عملیات حرارتی فولاد
- کاتالیست های سفارشی

Other Chemical,
Steel Industries
Refining
Plants

Custom Catalysts

As a knowledge based company, we have a dominant history in developing new catalysts from concept to completion, specialize conventional catalysts for a specific customer and improvement in our catalyst performance. Expert staff and well equipped research center enable us to offer our customers specialized catalysts based on their needs. We can offer based on blow general method:

- Toll Manufacture
- Licensed manufacture
- Custom manufacture

CUSTOM CATALYST

PeRformance
KinEtic
CatalySt
DEvelopment
ImpregnAtion
ReAction
ProDuCtion
SynthEsis

Technical Services

- Selection of the proper catalyst
- Technical reviews of start-up and shutdown procedures
- Technical assistance and inspection during catalyst loading
- Technical assistance during catalyst start-up
- Routine performance evaluations
- Immediate troubleshooting
- Catalyst life projections
- Technical assistance during catalyst shut-down
- On-site training seminars for engineering and operation personnels
- Chemical and physical analysis of the spent catalysts

2004

Establishment of Sarv Oil & Gas Company



2007

Catalyst Production Line Opening Ceremony



2008

Loading of SMR Catalyst in Zone 1, Shiraz Petrochemical Co.



2009

DRI Catalyst Field Test, Khouzestan Steel Complex



2011

3 barrel-day GTL Pilot Plant Opening Ceremony, Sarv



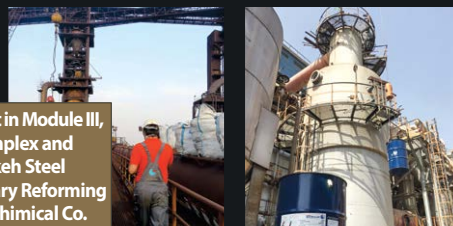
2014

Loading of DRI Catalyst in Module B, Mobarakeh Steel Complex



2015

Loading of DRI Catalyst in Module III, Khouzestan Steel Complex and in Module A, Mobarakeh Steel Complex and Secondary Reforming Catalyst in Razi Petrochemical Co.



2016

Co-precipitation Catalyst Production Line Opening Ceremony, Sarv



2017

Launch of new Strategic Products PERED DRI Catalyst Methanol Synthesis Catalyst





Endothermic Gas Catalyst

• SARV-250 Series

Nickel based catalyst supported on special alumina cement catalyzing the partial oxidation reaction between air and natural gas or propane to produce CO and H₂ in a high temperature retort. The reaction products are used for heat treatment of steel materials.



Ammonia Cracking Catalyst

• SARV-260 Series

Nickel based catalyst supported on special alumina cement catalyzing the ammonia dissociation reaction to produce mixture of Hydrogen and Nitrogen. The reaction products are used in heat treatment purposes like annealing, sintering, brazing, etc.



Paraffin Dehydrogenation Catalyst

• SARV-420

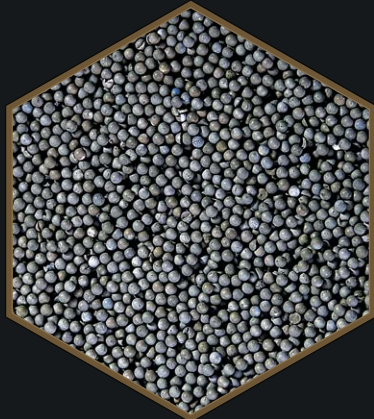
Tin promoted Platinum based catalyst supported on alumina, catalyzing the reaction of dehydrogenation of paraffin feedstream in LAB plants.



Acetylene Hydrogenation Catalyst

• SARV-510

Silver Promoted Palladium based catalyst supported on alumina used to catalyze removal of acetylene in the olefin cracking furnace outlet via hydrogenation.



Fischer-Tropsch Catalyst

• SARV-520

Cobalt oxide catalyst supported on alumina catalyzing the fixed bed Fischer-Tropsch reaction in GTL plants.



Hydrogen Removal Catalyst

• SARV-430

Pt/Alumina catalyst used to oxidize trace content of Hydrogen in the CO₂ feed stream of Urea plants.



Platforming Catalyst

• SARV-410

Rhenium promoted Platinum based catalyst supported on gamma alumina, catalyzing semi-regenerative naphtha reforming reaction used in the aromatization plants and Oil refineries.



Platforming Catalyst

• SARV-411

Rhenium promoted Platinum based catalyst supported on gamma alumina, catalyzing semi-regenerative naphtha reforming reaction used in the aromatization plants and Oil refineries.

Ammonia, Hydrogen plants

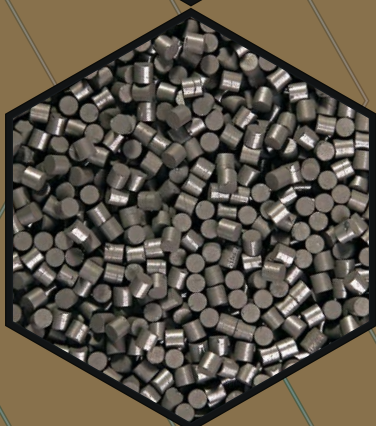


HTSC Catalyst

• SARV-150

Iron/Chrome/ Copper catalyst for the high temperature water gas shift reaction

** Used in Hydrogen, Syngas and Ammonia Plants*

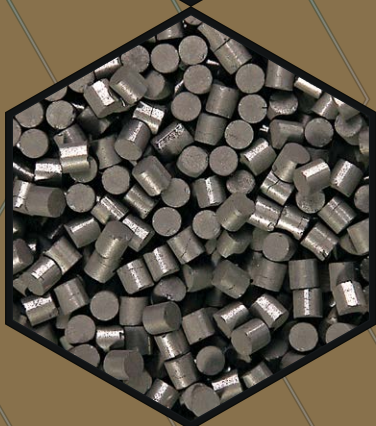


LTSC Catalyst

• SARV-140

Copper/Zinc/Alumina catalyst for the low temperature water gas shift reaction

** Used in Hydrogen, Syngas and Ammonia Plants*



Methanation Catalyst

• SARV-160

Ni/Alumina catalyst for the removal of low content of CO and CO₂ via Methanation reaction

** Used in Hydrogen, Syngas and Ammonia Plants*



Methanol Synthesis Catalyst

• SARV-190 (Ternary Cu_o/Zno/Al₂O₃ Catalyst)

For low pressure and temperature methanol synthesis

** Used in methanol production plants*



Pre-Reforming Catalyst

• SARV-100

Ni/MgAl₂O₄ Catalyst, installed in adiabatic fixed bed or radial flow reactor prior to primary or autothermal reforming sections in modern methanol, Ammonia or Hydrogen Plants. High nickel content with optimized dispersion makes this catalyst suitable for wide range of temperature, S/C ratio and hydrocarbon feedstock, from natural gas to Naphtha.



Steam Reforming Catalyst

We offer full range of Steam Reforming Catalyst, Different types of formulation and shape; make us capable of offering catalyst for all kind of tubular reformer design and feedstock in Hydrogen, Syngas, Methanol and Ammonia plants.

Conventional Types

Nickel based catalysts supported on:

- Calcium Aluminate (SARV-110, SARV-111)
- Alpha Alumina (SARV-110A)

* Steam Reforming of natural gas, light hydrocarbons and refinery gases

Promoted Types

Potassium promoted Nickel based catalysts supported on:

- Calcium Aluminate (SARV-110P, SARV-111P)

* Steam Reforming of heavier natural gas and LPG

High Alkali Types

Potassium promoted Nickel based catalysts supported on:

- Calcium Aluminate (SARV-113N)

* Steam Reforming of mixed feed, LPG and Naphtha



Autothermal and Secondary Reforming Catalyst

- SARV-120 (Air Fed Units)
- SARV-111 (Oxygen Fed Units)

For secondary reforming of upstream reforming effluent, we offer Nickel based catalyst supported on Calcium Aluminate for both oxygen fed units in methanol plants and air fed units in ammonia plants. As well a special heat active heat shield layer for the top layer of main catalyst bed is presented.



• SARV-120H

Active Heat Shield for top Layer



Sulfur Removal

• SARV-610

ZnO based adsorbent used to eliminate sulfur content in the hydrocarbon feedstocks.

* Used in syngas, Hydrogen, Ammonia and methanol plants.



Hydrogenation Catalyst

• SARV-620

Cobalt-Molybdenum catalyst supported on Alumina used for hydrogenation of organic sulfur compounds in the hydrocarbon feedstocks.

* Used in syngas, Hydrogen, Ammonia and methanol plants.

PERED® Process

PERED is a "Direct Reduction Technology" invented and patented by MME in 2007. The Iranian engineer's collective experience gave birth to a new reduction technology which is targeted to build up an economically feasible Direct Reduction plant with optimum usage of energy and raw material. Due to some modification in reformer operating pressure and temperature, a new type of high active catalyst is developed for this new licensed plant.



Active Catalyst
• SARV-234 Series ($\text{Ni}/\text{Al}_2\text{O}_3$)



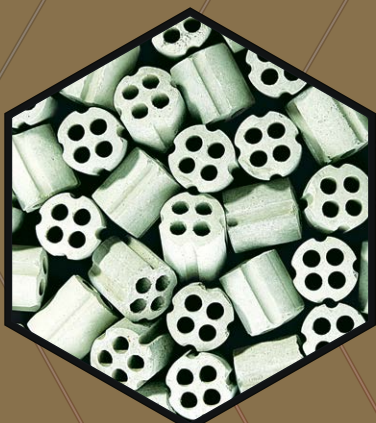
Semi-Active Catalyst
• SARV-220 (Ni/MgO)



Inert Catalyst
• SARV-210 (Al_2O_3)

Energiron Process

A common option for the Energiron DRI plants is the production of reducing gas by means of an external steam reformer fed by natural gas, LPG, naphta or mixed feeds. We have catalytic solutions for all kind of steam reformer design and feedstocks. The details of the product are presented in the Syngas production section.



Steam Reforming Catalyst
• SARV-110 Series

In process for the production of Direct Reduced Iron (DRI) or Sponge Iron, the reducing gas is generally produced by the catalytic Steam/ CO_2 reforming of natural gas feedstock in the tubular fired heat reformers. We offer complete catalyst solution for the synthesis of reducing gas.

Midrex® Process

Midrex is a direct reduction process using a shaft-reactor to produce sponge iron. Iron ore pellets are reduced in a vertical shaft or reduction furnace to metallic iron by means of a reduction gas. The reducing gas is produced from a mixture of natural gas and recycled gas from the reduction furnace. The mixture flows through reformer tubes where it is catalytically converted into a gas containing H_2 and carbon monoxide (CO) through steam/ CO_2 reforming reactions.

Regarding to the very severe operating conditions in Midrex reformers due to reformer high temperatures, low pressures, low steam to carbon ratio and high CO_2 content in the reformer feedstock, two varieties of catalysts along with an inert bed layer should be loaded to avoid catalyst deactivation, one with higher nickel oxide content and activity based on alumina and the other with lower nickel oxide and activity on dead burned magnesium oxide carrier.

The feedstock moves upward inside the tubes and accordingly the catalysts loading pattern should be adjusted in a way that the feed gas stream firstly pre-heated over sufficient volume of ceramic support layer, then partially reformed and heated over semi-active MgO based catalyst. The complementary reforming will be done over high active Al_2O_3 based catalyst.

We devise different types of these catalysts with different activity for different designs of midrex plants.



Active Catalyst
• SARV-230 Series ($\text{Ni}/\text{Al}_2\text{O}_3$)



Semi-Active Catalyst
• SARV-220 (Ni/MgO)



Inert Catalyst
• SARV-210 (Al_2O_3)

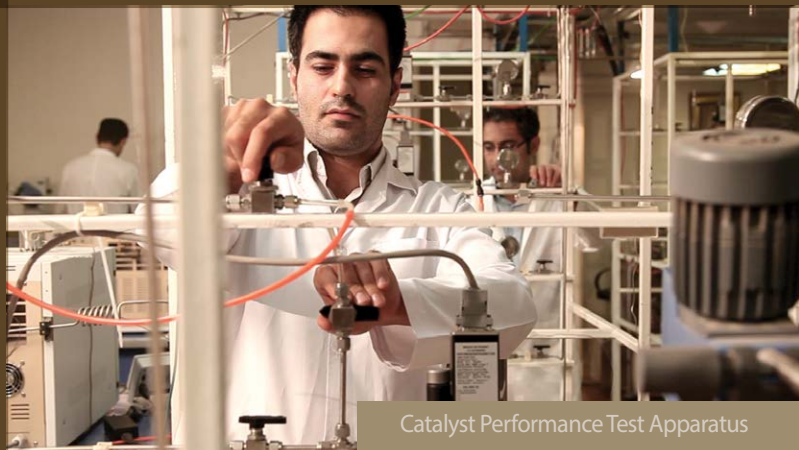
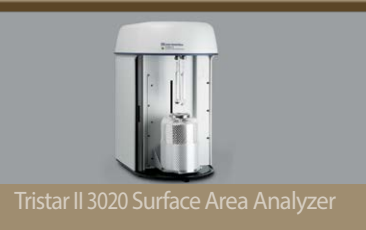


Catalyst Product Portfolio

As a leading knowledge based Iranian company, Sarv delivers a wide range of catalysts for different industries. All the products are formulated based on our innovations and expertise built on capabilities of our catalyst research center.

Our products are generally focused on the following Industries:

- Direct Reduction of Iron Plants
- Ammonia & Urea Plants
- Methanol Plants
- Syngas and Hydrogen Plants
- Olefin Plants
- Precious Metal Based Catalysts for Petrochemical and Oil Refining Plants
- Steel Heat Treatment Plants
- Custom Catalysts



Catalyst Research Center

Research in the Catalyst Research Centre covers all of the catalyst synthesis and modification, physico-chemical characterization and testing under industrially relevant conditions. The unit is the leading research group in catalysis in Iran and comprises academics and PhD candidates in the field of chemistry and chemical engineering. The unit enjoys excellent relations with similar academic groups in Iran as well as substantial co-operation with domestic industry. Our research center is equipped by sophisticated devices that enables us to find the optimum operating condition for the catalysts and offers some technical instructions and procedures to enhance the catalyst performance in industrial plants.

The following are a short list of capabilities of our center:

1. Investigation of physical and chemical properties of various catalysts and adsorbents.
2. Catalytic performance assessment of various catalytic processes, under different operational conditions.
3. Selection the best catalysts for special process and define the optimal operation condition for it.
4. Developing know-how for catalyst manufacturing in lab scales.
5. Catalyst production scale up.
6. Modelling and simulation of various catalytic processes.



SARV Oil & Gas

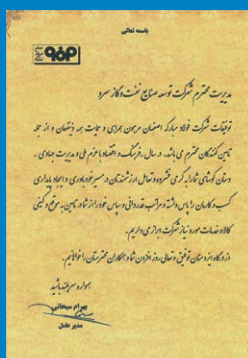
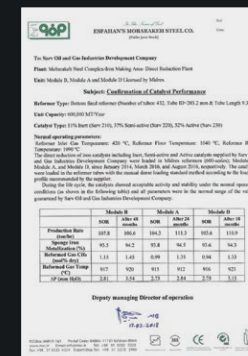
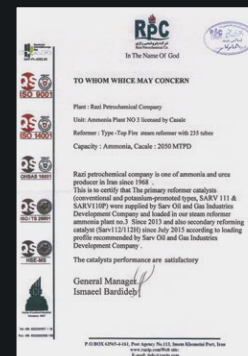
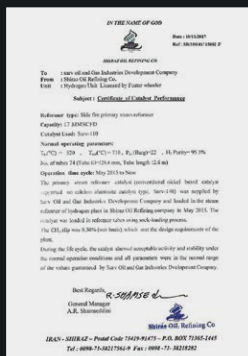
SARV Oil & Gas Industries Development Company is a pioneer catalyst producer in Iran. Also, this knowledge-based private company achieved to the GTL process know-how at 2010 and established a 3 Barrels per day GTL demo plant in the factory field. During past 15 years, SARV has performed development of know-how and mass production of high quality catalysts. Our catalysts have shown brilliance performance in DRI, Ammonia, Methanol and Hydrogen plants and we has received satisfactory feedback on our products from the customers, convincing them to consider SARV as a pioneer brand in Iran catalyst market and now we are intended to introduce our products to the overseas markets.



GTL Technology

Gas to liquids (GTL) is a refinery process to convert natural gas or other gaseous hydrocarbons into longer-chain hydrocarbons, such as gasoline or diesel fuel. The products contain almost none of the impurities, sulphur, aromatics and nitrogen that are found in crude oil. Sarv has designed the GTL process from the natural gas purification unit to liquid fuel separation plant and construct 3 barrel/day pilot plant based on the knowledge of Iranian experts. All of the catalysts such as synthesis gas production and FTS, were produced by the Sarv R&D department. The pilot plant was in service for 4 month continuously and the operating data were gathered for process modification and scale up.





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