



# Ionikylation

## Composite Ionic Liquid Alkylation

A Commercially Proven, Non-Hazardous, Non-Corrosive, and Environmentally Friendly Composite Ionic Liquid (CIL) Alkylation Technology



### COMPETITIVE ADVANTAGE

Ionikylation is Well's composite ionic liquid alkylation process that produces high octane gasoline constituents from refinery streams. Ionikylation offers the following advantages over conventional alkylation technologies:

- Many commercial units
- Inherently safe process
- Non-corrosive system: low-cost carbon steel equipment
- Non-hazardous emissions and waste, reduced waste water
- Environmentally friendly
- High catalyst activity, stable reactor operating system
- High quality alkylate product (96-98 RON, chloride < 5ppm)
- Integrated catalyst regeneration
- Competitive energy consumption

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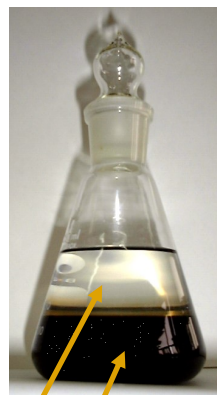
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# Well

## CIL CATALYST

- Highly tunable
- Liquid salt (melting point less than 100°C)
- Non-corrosive
- Relatively high solubility and diffusivity for hydrocarbons
- Forms no emulsions with hydrocarbon and is dense (easy to separate reactants)



Alkylate (96-98 RON)

CIL Catalyst



## INHERENTLY SAFE CATALYST

- No adverse reaction when contacted with skin
- Spill incident: wipe with dry cloth or paper and rinse
- Standard PPE: wear coveralls containing plastic liner, safety glasses

## TECHNOLOGY COMPARISON

	HF	H <sub>2</sub> SO <sub>4</sub>	Composite Ionic Liquid
Non-hazardous	✗	✓	✓
Non-corrosive	✗	✗	✓
High activity	✓	✗	✓
High selectivity	✓	✗	✓
Commercially proven	✓	✓	✓

Health, safety, and environmental factors should be paramount in driving investment decisions. In an era where environmental preservation and safety are top priorities, Ionikylation is the alkylation technology of choice.

## EFFECTIVE RESOURCE UTILIZATION



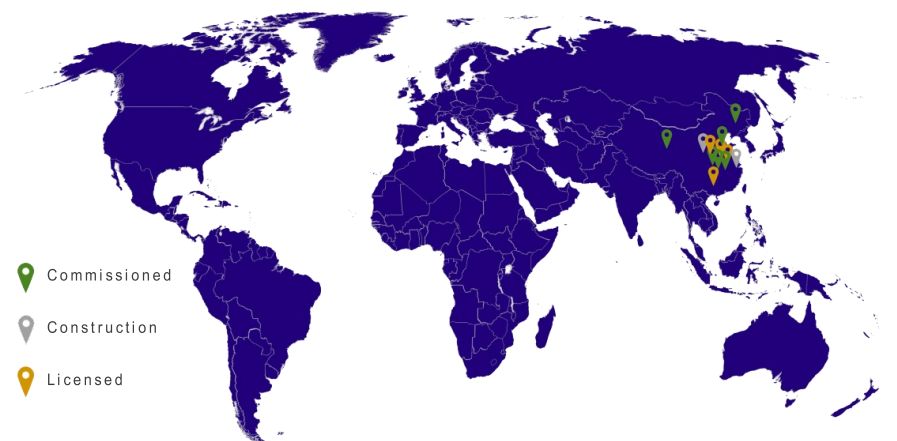
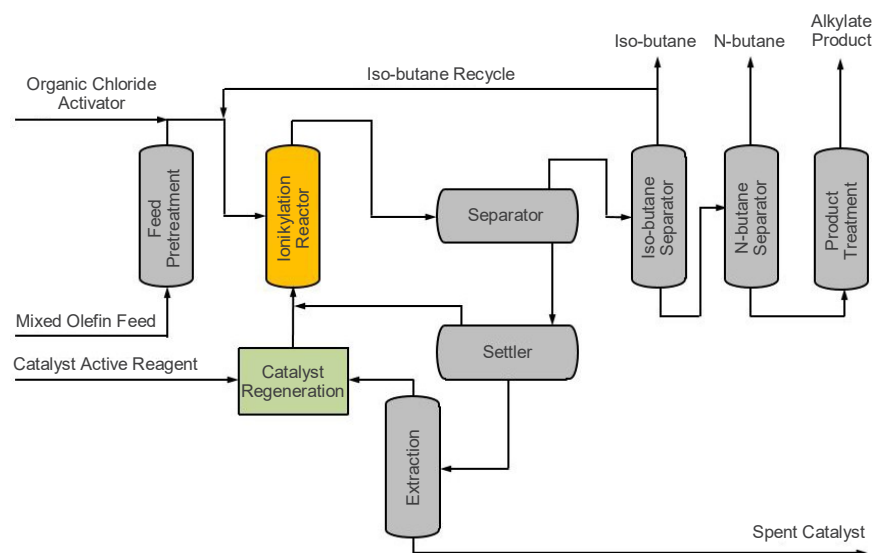
Well's philosophy is simple: start with the science. A deep technical understanding of the relevant issues is key to the development of meaningful solutions. Well's world-class expertise and partner facilities uniquely position it to be at the forefront of groundbreaking technology development and licensing. Learn more at [www.wellresources.ca](http://www.wellresources.ca)



## IONIHYLATION PROJECTS

As of Q1 2021

### IONIHYLATION PROCESS



### SAFE EQUIPMENT

April 2016: Ionikylation unit passed the government safety inspection after 3 years of continuous operation; no corrosion in any equipment internals.



All Ionikylation process equipment is constructed of **carbon steel**.



INTEGRITY. INNOVATION. IMPACT.

At Well, we are passionate about developing meaningful solutions to major issues in the oil and gas industry.

We develop and license green, cost-effective, and commercially proven technologies based on over 40 years of research and development.

# Well

## COMMERCIAL IONIKYLATION UNITS

Commercially operating and licensed Ionikylation facilities exist throughout Asia-Pacific. Major refiners (including PetroChina and Sinopec) will construct 10 new Ionikylation units between 2018-2020, ranging from 50,000 tpy to 300,000 tpy.



PetroChina Harbin Refinery  
150,000 tpy



PetroChina Golmud Refinery  
50,000 tpy



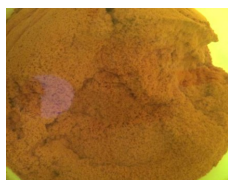
Sinopec Jiujiang Refinery  
300,000 tpy



Sinopec Wuhan Refinery  
300,000 tpy

## SAFE BY-PRODUCTS

Ionikylation by-products are chemically benign and can be safely handled and disposed. No more spent acid treatment.



Benign Paste from Extractor



Solidify



Dry



## LICENSING IONIKYLATION

To explore licensing opportunities, contact us at [info@wellresources.ca](mailto:info@wellresources.ca)