ELIXIR OF OIL INDUSTRY:

POWERING THE PRESENT, SHAPING THE FUTURE.

PETRO EXIR Co.

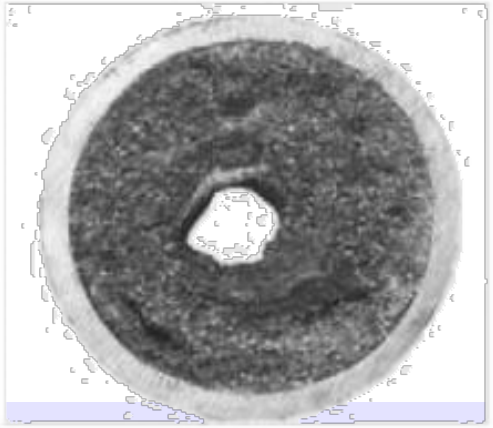
PETRO EXIR

Introduction

Asphaltene precipitation/deposition may cause severe problems in the petroleum industry, affecting reservoirs, wellbores, and surface facilities.

The economic penalty of asphaltene deposition is significant, prompting ongoing research for prevention and removal solutions.

(a) Asphaltene



(b) Wax

(c) Hydrate

Asphaltene problems

Common Asphaltene Problems are:

Deposition in Reservoirs:
Formation Damage

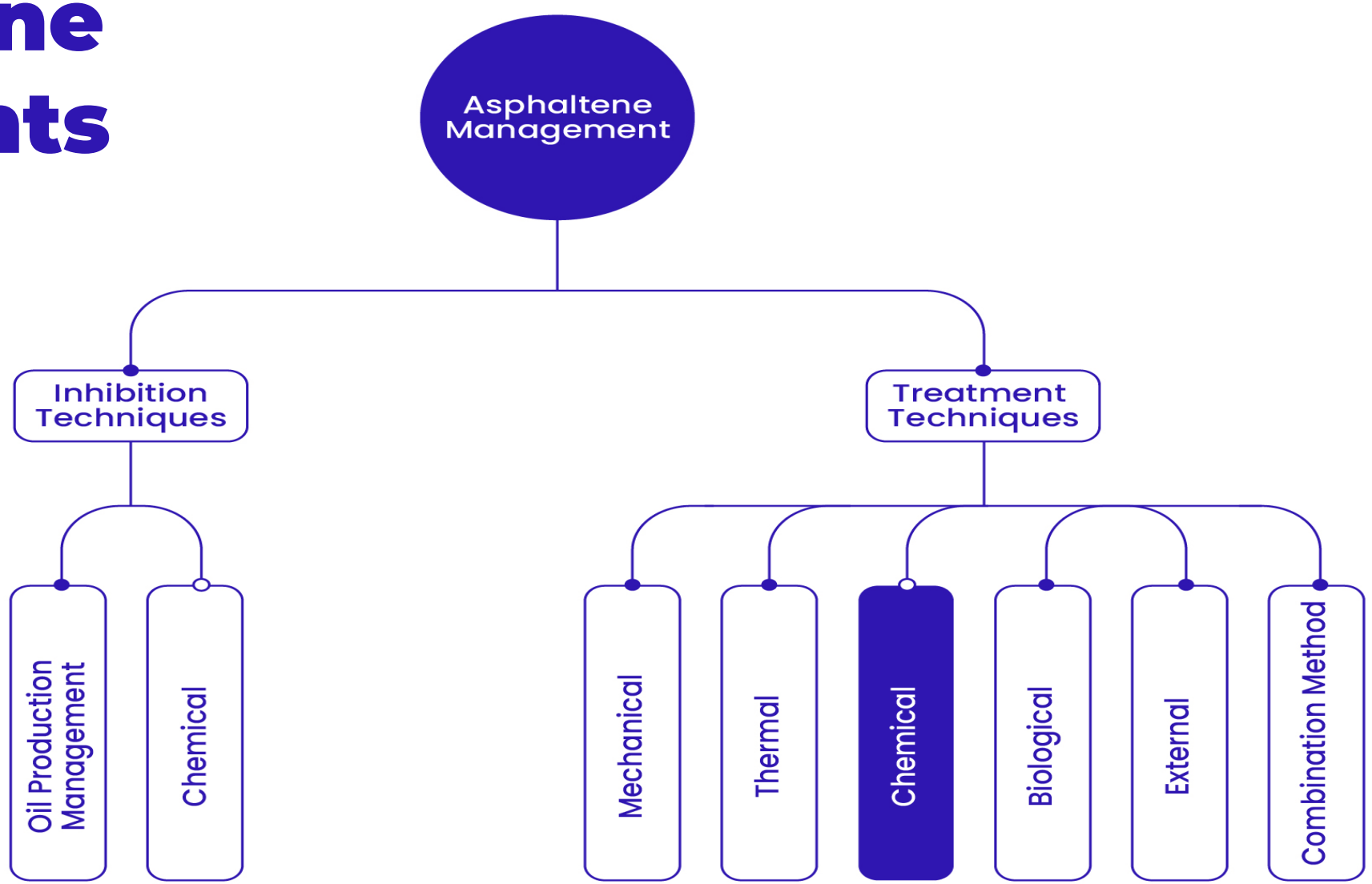
Processing Problems:
Refinery Fouling
Emulsions

Flow Assurance Issues:
Pipeline Blockages
Equipment Fouling

Enhanced Oil Recovery (EOR) Challenges:
Chemical Interactions

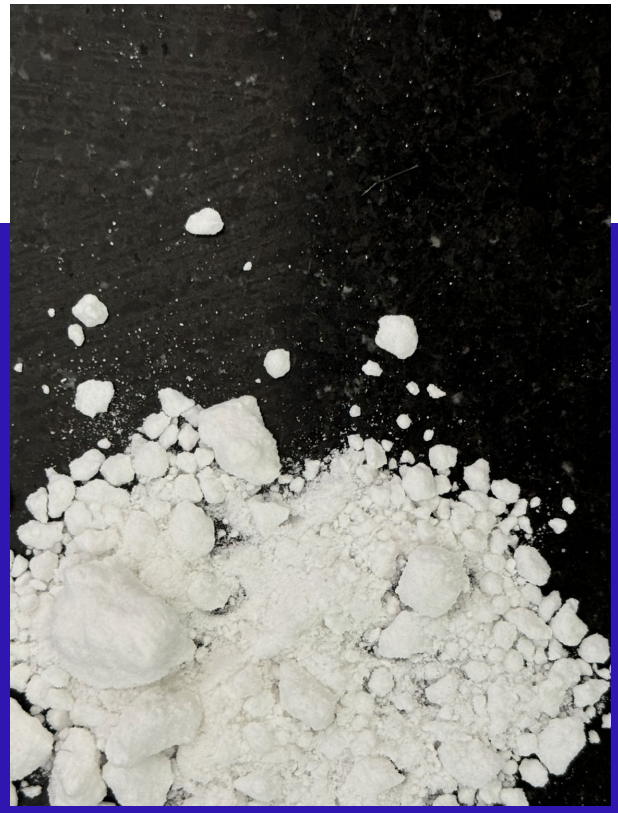
PETRO EXIR

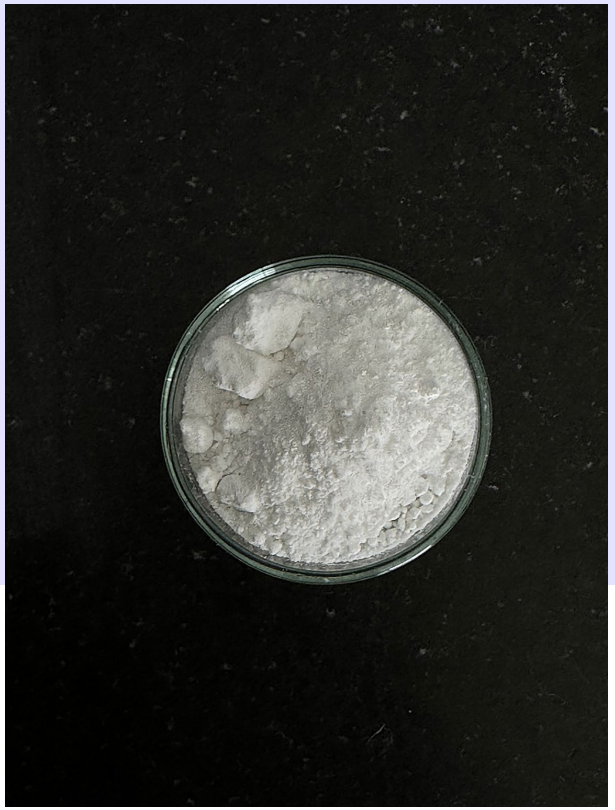
Asphaltene Treatments



PETRO EXIR

About Technology





PETRO EXIR

Exira

We are a leading producer of innovative chemicals in the oil, gas and petrochemical industry, designing environmentally friendly products for removing oil deposits, oily sludge, coke, and asphaltene. Our products target asphaltene, waxes, resins, paraffin deposits, and specific petroleum contaminants and provide reliable solutions to personnel exposure risk, unit failure and disposal costs.

Why EXIRA Chemicals?

Our products are proven to reduce outage time in production

We save money on critical operations

We reduce costs toward traditional mechanical and chemical cleaning

2 **We have over 2 years of asphaltene removal experience**

PETRO EXIR

Properties

- Multipurpose Use
- Effective on various surfaces
- Removes Tough Deposits
- Water-Based
- Cost-Effective
- Safe and Easy to Use

PETRO EXIR

Applications

Enhanced oil recovery

The wettability alteration is one of the mechanisms that can cause enhanced oil recovery by EXIRA.

Oil production

One of the main challenges in oil production is the deposition of heavy compounds in the tubing string, pumps, and surface facilities. The EXIRA is used to removal these deposits from these surfaces.

Oil transport and storage

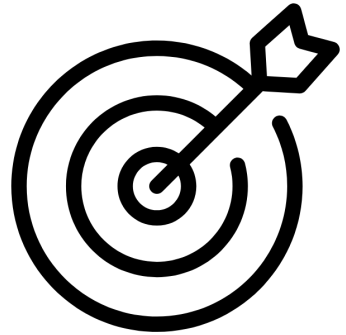
Deposition of heavy organic compounds in oil tankers and tanks causes damage to hull and also damage to the employees' health. This product can remove heavy compounds from the surface without damaging the surface paint.

Refinery Debottlenecking

Refineries experience operational bottlenecks, impacting efficiency and escalating costs. Chemical cleaning eliminates contaminants and deposits in equipment and piping, enhancing flow and minimizing blockage risks, thus reducing bottlenecks. It also boosts equipment efficiency, like heat exchangers and distillation columns, by removing scale, coke and deposits, improving heat transfer.

PETRO EXIR

Goals



- Asphaltene removal from reservoir, well column, pumps, surface facilities and pipelines
- Coke removal from refinery facilities
- Removal of heavy oil, oily sluge, and etc. from oil tanker surfaces
- Washing oil tanks

Our Analysis

Contact angle analysis

- asphaltene/organic components removal from surface
- optimum concentration
- optimum temperature
- thermal stability
- effect of ions (Na+, Ca2+, Mg2+)

Asphaltene removal

- Removal of asphaltene from various surfaces
- effect of concentration
- effect of temperature

Core flooding

- effect of EXIRA on asphaltene removal from blocked core at optimum conditions

PETRO EXIR

Experimental Tests

PETRO EXIR

Experimental Tests

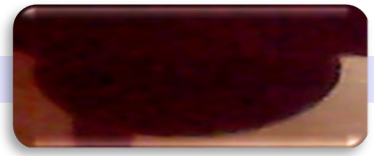
Contact angle analysis
optimum concentration

CA before treatment

CA = 130

2% EXIRA

CA after treatment



CA = 25

CA before treatment

CA = 150

1% EXIRA

CA after treatment

CA = 35

CA = 138

3% EXIRA

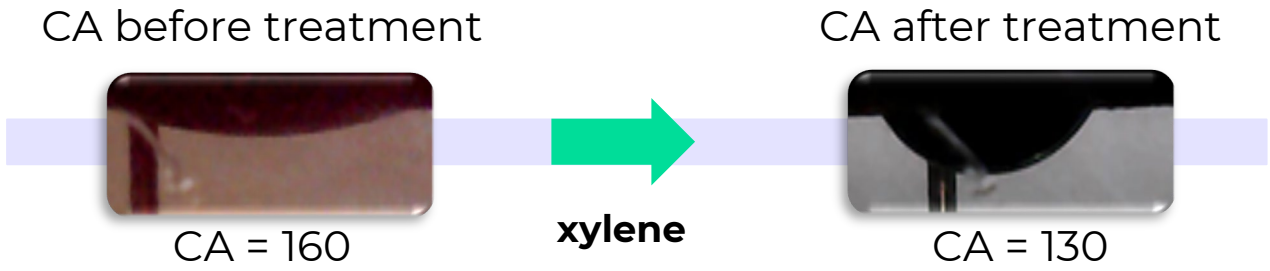
CA = 15

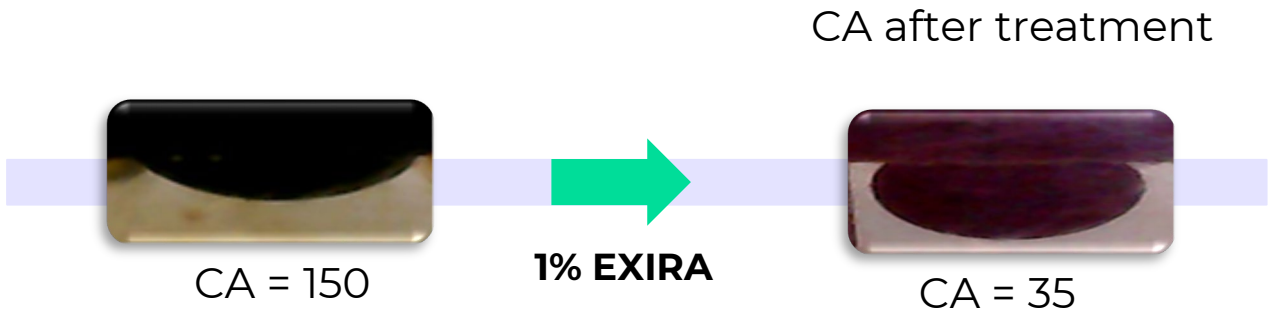
PETRO EXIR

Experimental Tests

Contact angle analysis

Comparison between EXIRA and xylene





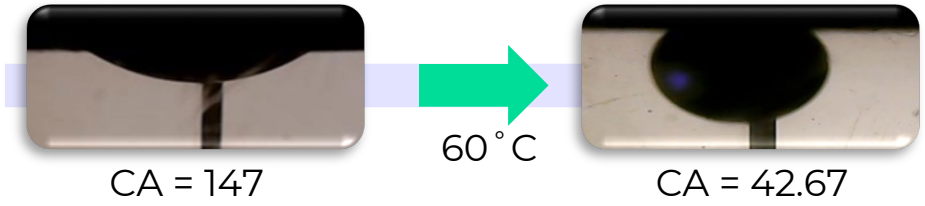
PETRO EXIR

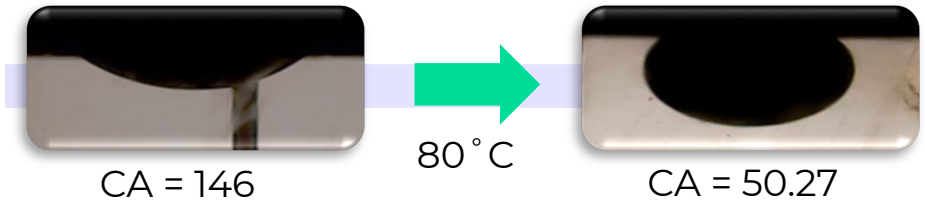
Experimental Tests

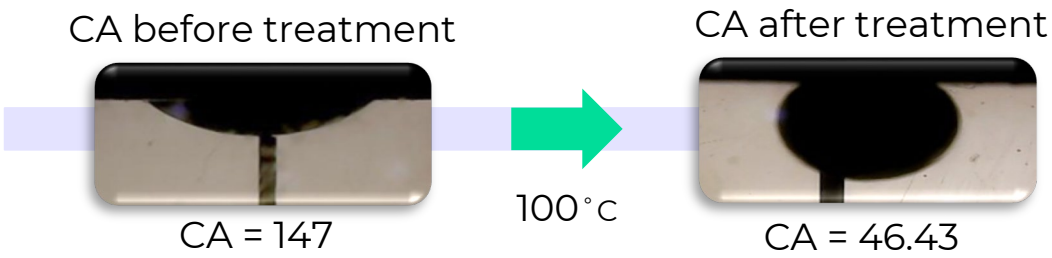
Contact angle analysis

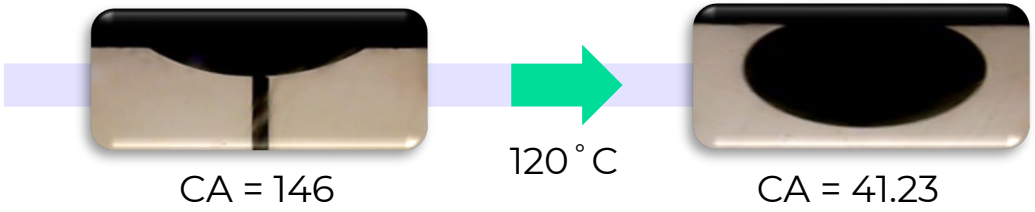
optimum temperature

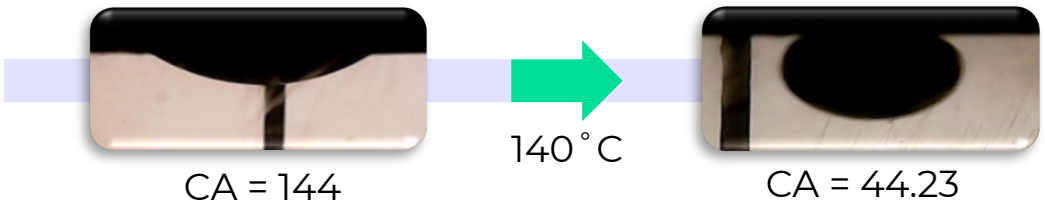
thermal stability











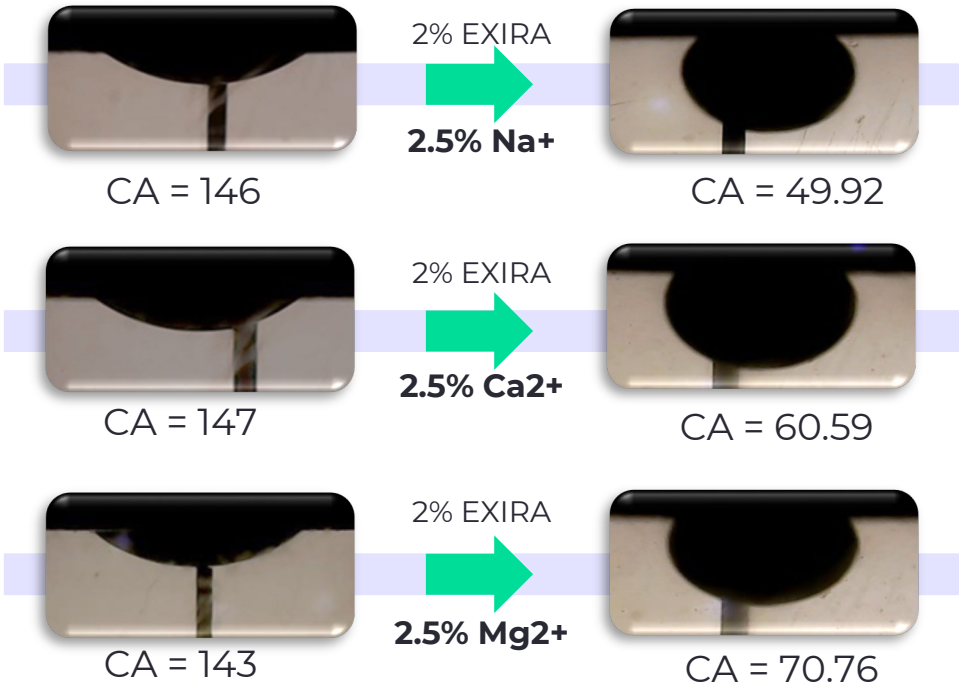
PETRO EXIR

Experimental Tests

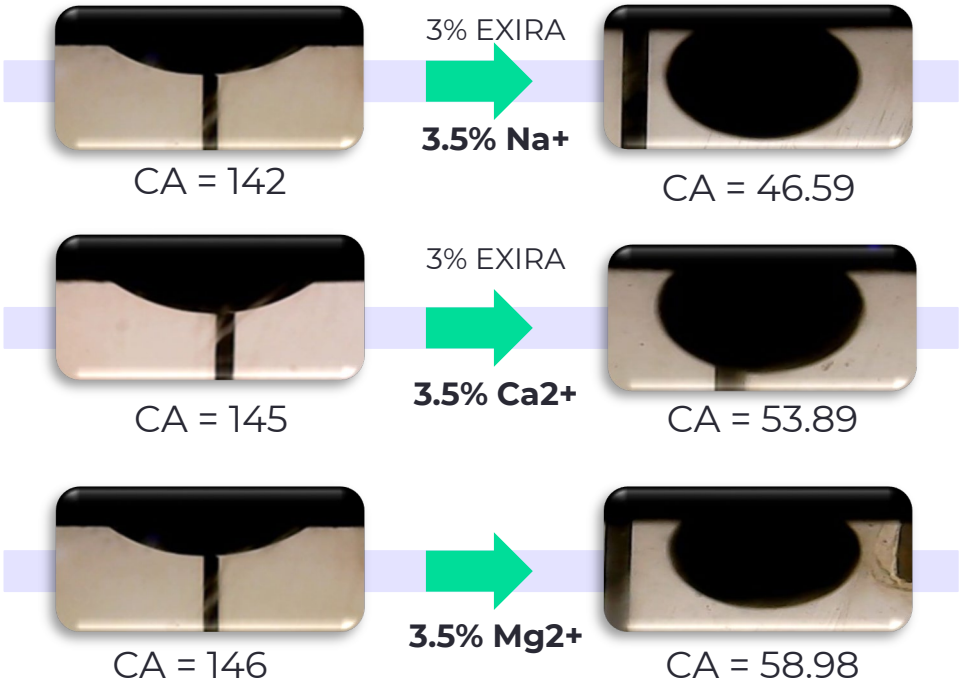
Contact angle analysis

effect of ions (Na+, Ca2+, Mg2+)

CA before treatment | CA after treatment



CA before treatment | CA after treatment



PETRO EXIR

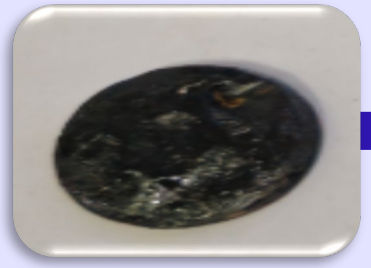
Experimental Tests

Asphaltene removal

Removal of asphaltene from various surfaces

Metal surface

Before



0.0410 g asphaltene

81%

After

0.0074 g asphaltene

Rock surface

Before

0.0350 g asphaltene

88%

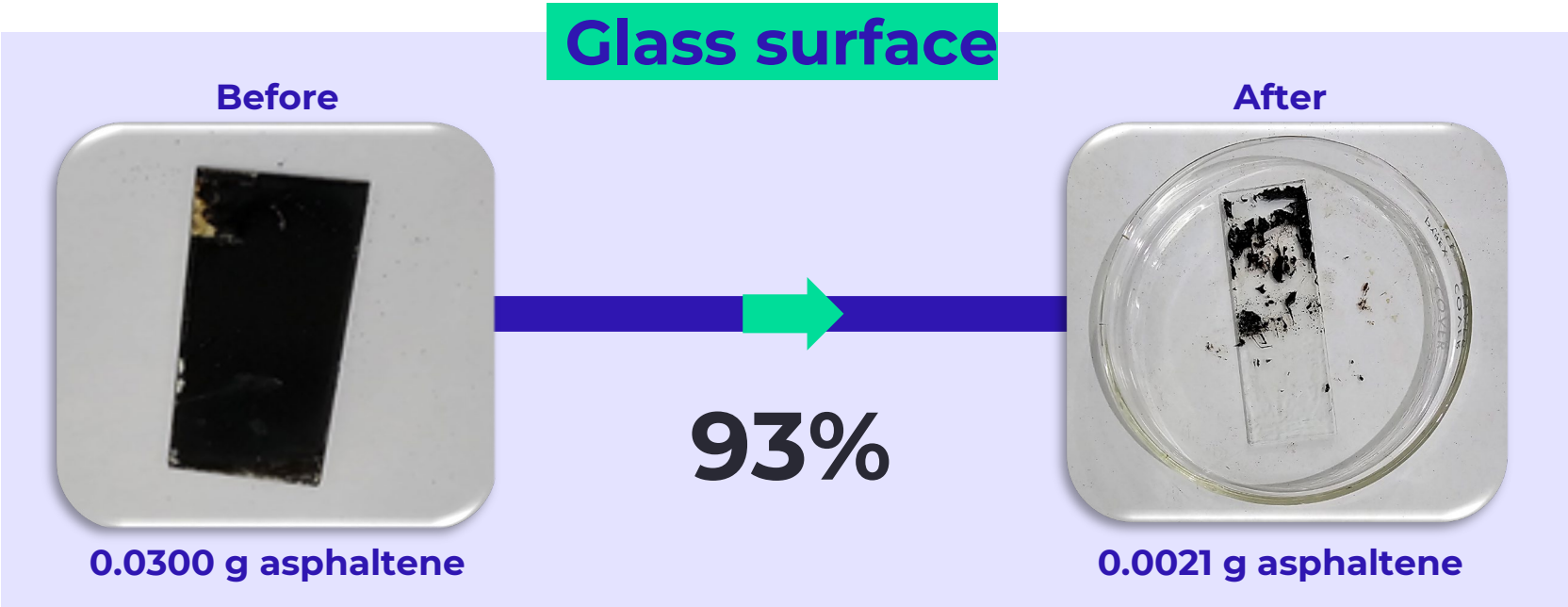
After

0.0042 g asphaltene

Experimental Tests

Asphaltene removal

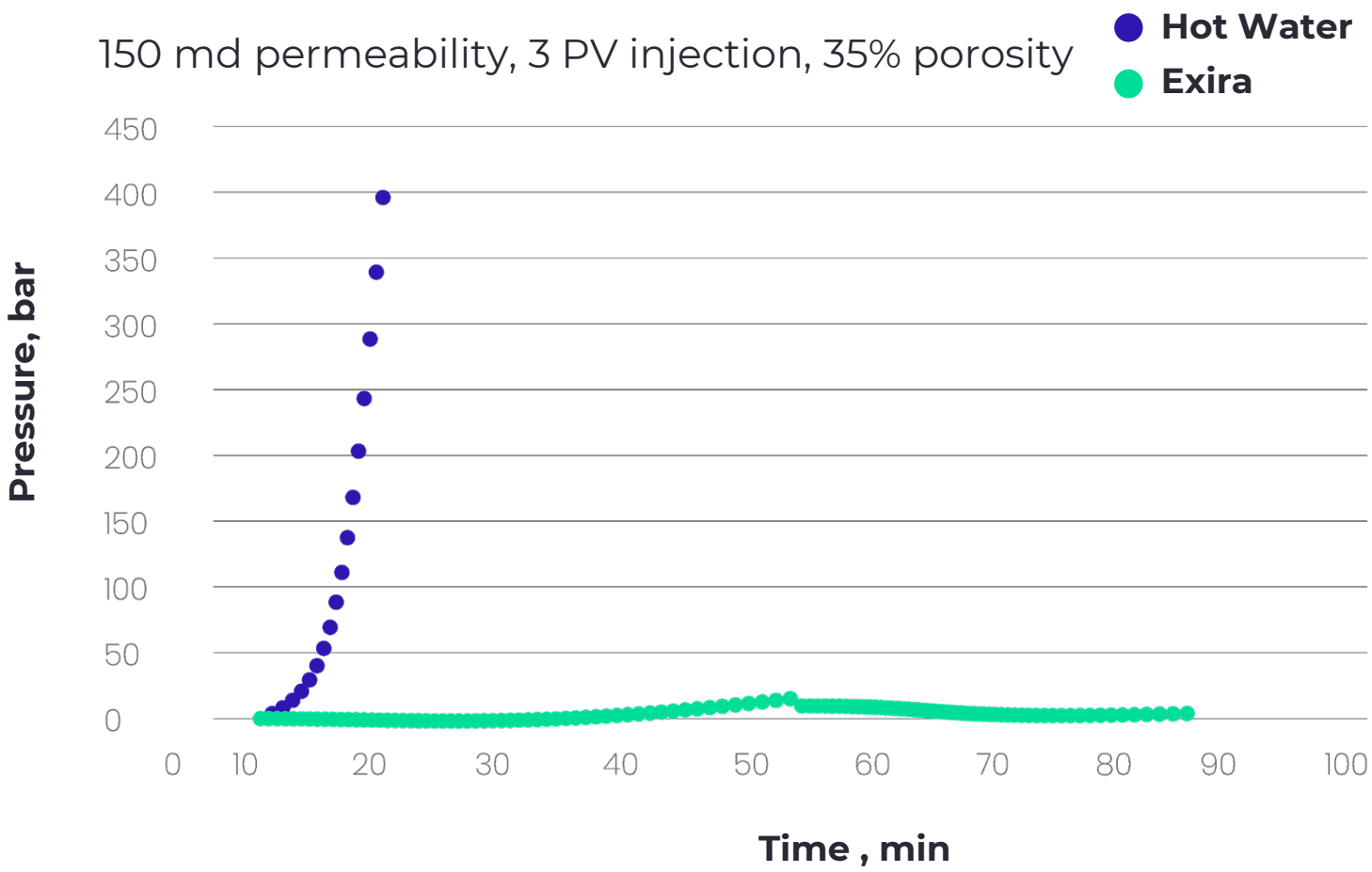
Removal of asphaltene from various surfaces



Experimental Tests

Core flooding

effect of EXIRA on asphaltene removal from blocked core at optimum conditions

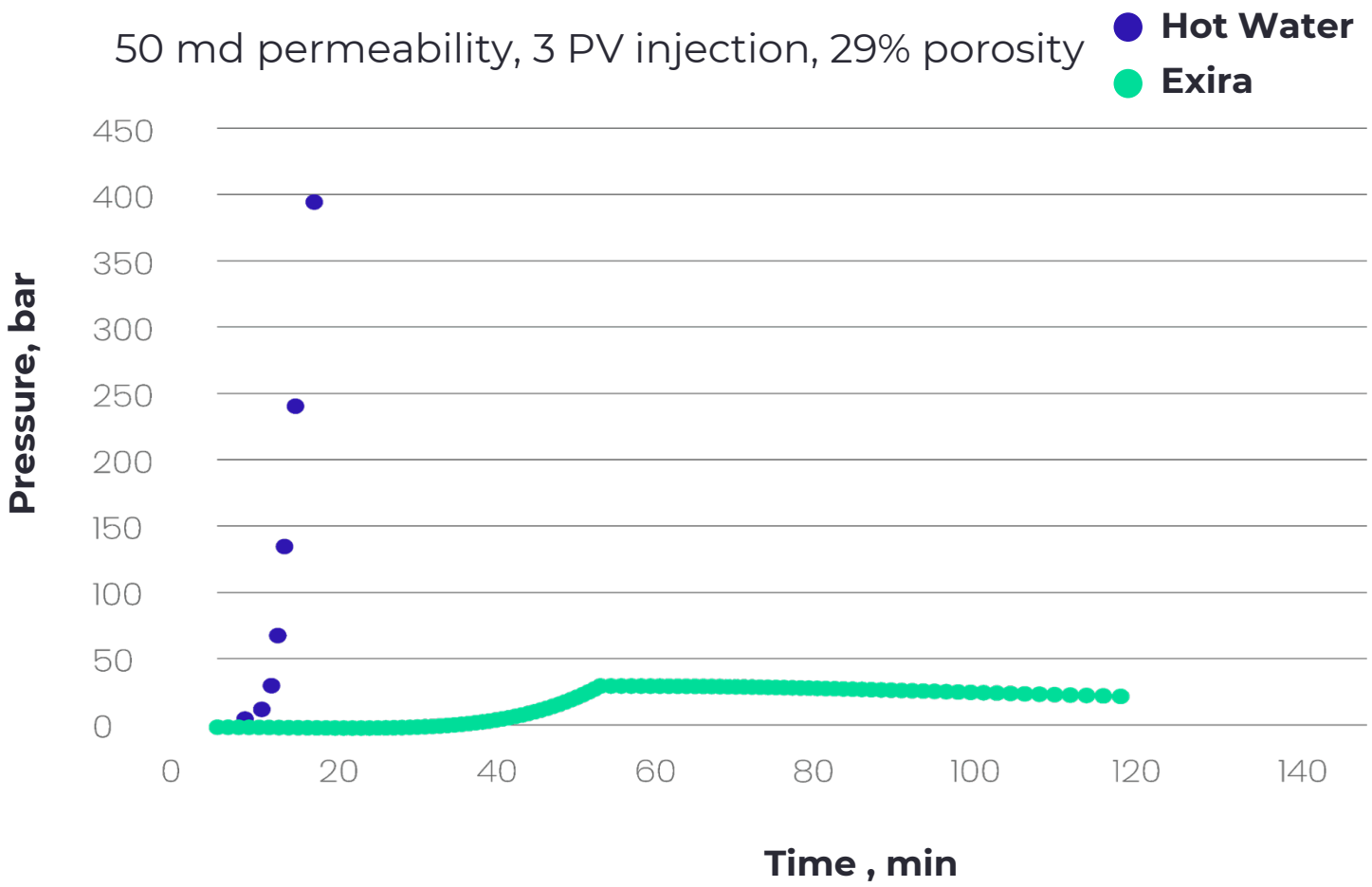


PETRO EXIR

Experimental Tests

Core flooding

effect of EXIRA on asphaltene removal from blocked core at optimum conditions

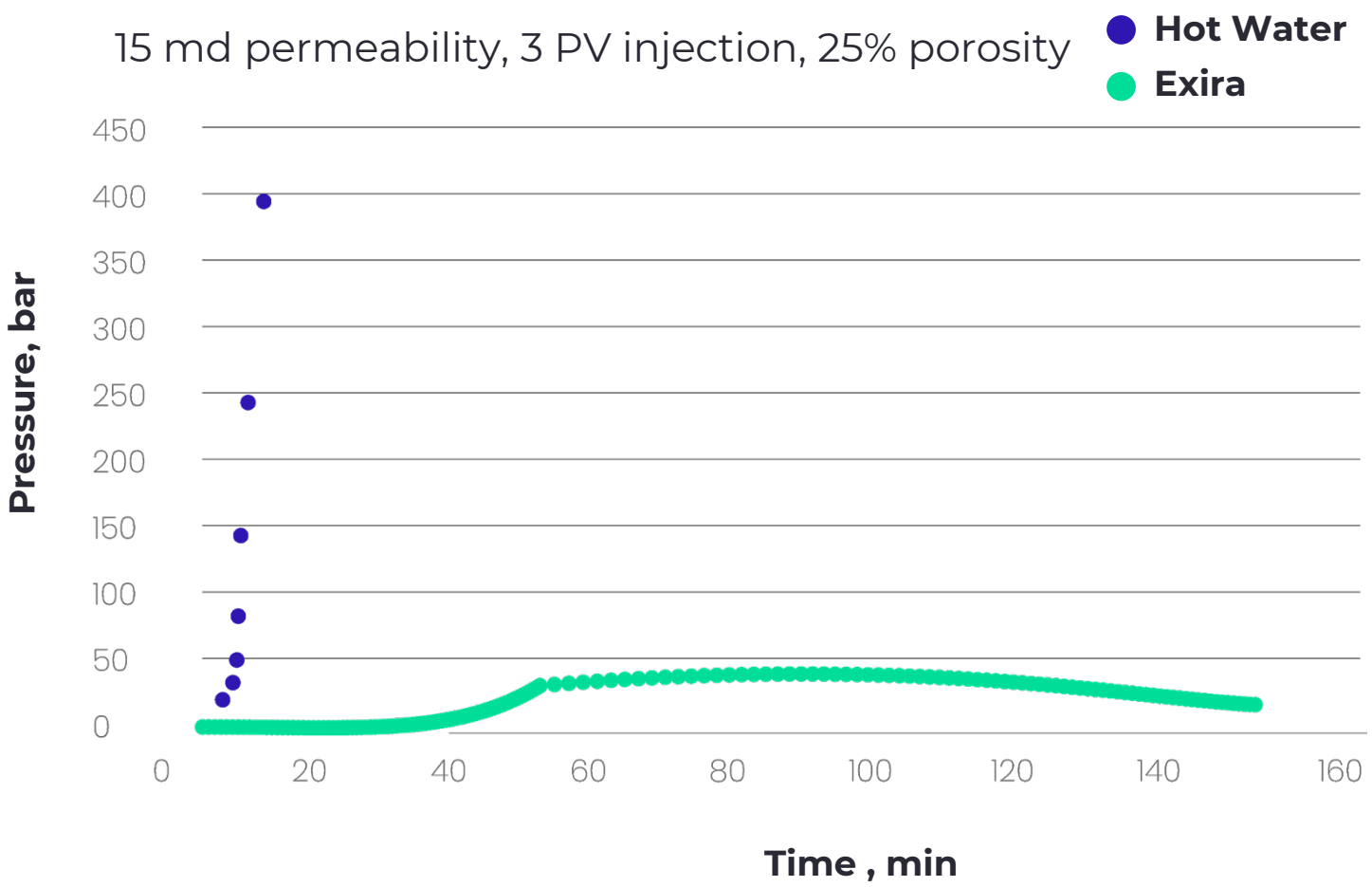


PETRO EXIR

Experimental Tests

Core flooding

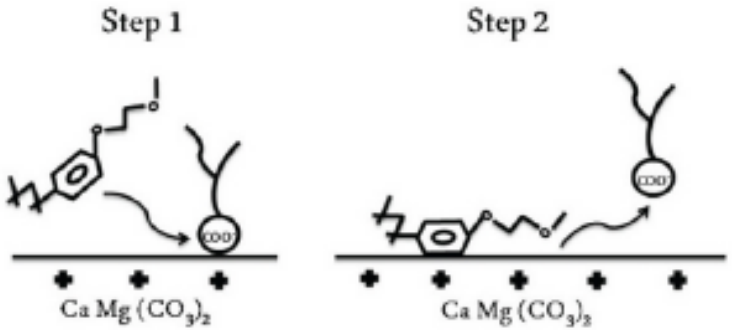
effect of EXIRA on asphaltene removal from blocked core at optimum conditions

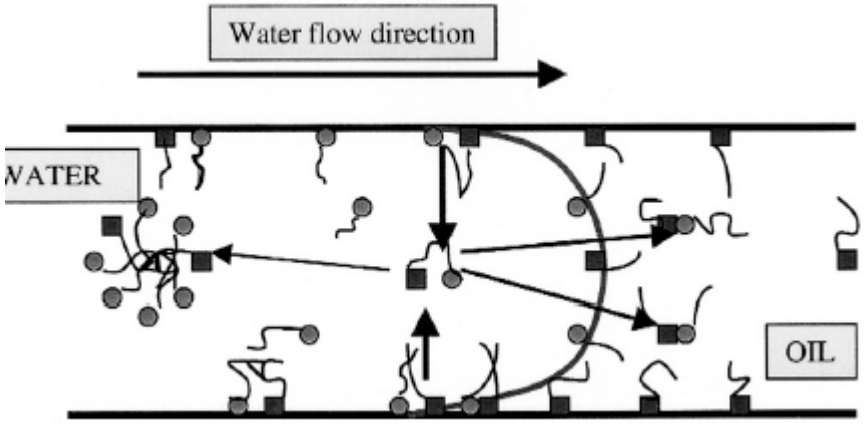


PETRO EXIR

Mechanism

- EXIRA are capable of adsorbing on surface via electrostatic interaction.
- The zeta potential at the surfaces is subsequently decreased. It is easier for adsorbed asphaltene/wax components to be swept by EXIRA
- EXIRA increases cleaning efficiency by balancing water hardness
- EXIRA reacts with acidic hydrogen in crude oil fractions, forming soap-like surface active agents
- Adhesion forces become weaker
- React with carboxylic acid groups, most of which are found in the heavier fractions of crude oil asphaltenes.





PETRO EXIR

Typical Operation

Preparation:

- Water from the truck tank is transferred to the tank.
- Prepare a 1%, 2%, or 3% solution with the required amount of EXIRA.
- Start heating, mixing, and dissolution of EXIRA.
- Heat the solution to 60°C over two hours.

No.	Service
1	Coiled Tubing unit and crew for cleaning
2	Exira
3	Tank
4	Heating System

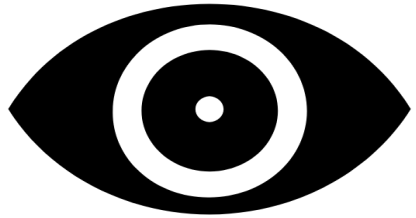
HSE requirement

Actions to be taken	Hazards
May cause an allergic skin reaction	H317
May cause respiratory irritation	H335
Rinse mouth, DO NOT induce vomiting	IF SWALLOWED
Take off all contaminated clothing, rinse skin with water	IF ON SKIN (hair)
Move person to fresh air and keep comfortable for breathing	IF INHALED
Rinse cautiously with water for several minutes, remove contact lenses (if present), continue rinsing	IF IN EYES

EXIRA is better to use outdoor or in well ventilated area. Avoid release to environment.
Do not breath dust or mist.
Wash hands thoroughly after handling.
Wear protective gloves, coverall, protective glasses.

Future vision

1. develop an eco and environment friendly EOR agent
2. develop a detergent for dish and clothes washing
3. improved EXIRA by nanotechnologies method



Case Study

PETRO EXIR

Case Study

Case Study 1:
Well XXX-004

Category	Details
Well Designation	XXX-004
Testing Start Date	April 1, 2022
Well Production Data	
- Total fluid (Qf)	4.8 m^3/day
- Oil (Qo)	0.72 m^3/day
- Water Cut (WC)	86%
- Production Method	Electric Submersible Pump (ESP)
- Pipeline Length	650 m
Chemical Treatment Process	
- Water Transferred	2.5 m^3 to two tanks (each 2 m^3 capacity)
- Solution Heating	Heated to 60°C over two hours
Injection Process	
- Initial Injection Rate	55-125 L/min
- Injection Duration	30 minutes
- Additional Water Pumped	0.5 m^3 after chemical injection

Case Study

Case Study 2:
Commingled Pipeline at Wells XXX-087/088

Category	Details
Pipwline Designation	Commingled pipeline at wells XXX-087/088
Testing Start Date	April 14, 2022
Well Production Data	
- Total fluid (Qf)	7.3 m^3/day
- Oil (Qo)	2.63 m^3/day
- Water Cut (WC)	64%
- Production Method	Sucker Rod Pump (SRP)
- Pipeline Length	660 m
Pre-Treatment Conditions	
- Pipeline Cleaning	Regular cleaning on April 13, 2022
- Initial Pipeline Pressure	6 bar
- Cleaning Frequency	Daily (twice a day in winter)
- Monitoring Plan	Assessed by monitoring line pressure and time until next treatment
Chemical Treatment Process	
- Water Transferred	2.5 m^3 from truck tank to 4 m^3 capacity pump tank
- Temperature	Heated to 49°C in one hour
- Final Solution Volume	3.5 m^3
Injection Process	
- Initial Injection Rate	78 -100 L/min
- Injection Duration	30 minutes
- Post-injection	0.5 m^3 of water pumped after chemical injection

ELIXIR OF OIL INDUSTRY

www.petroexira.com

Mail: Exirpetro@Gmail.com

Fax: +21_71057129

Address: Eram, Shiraz, Fars, Iran

PETRO EXIR