



Boulder Scientific Company™

INNOVATIVE SPECIALTY CHEMICAL SOLUTIONS

SOCMA 2023

Nashville, TN

Confidential



Our Heritage



- **1950:** John Birmingham pioneered the synthesis of metallocenes at Harvard during his graduate work with Sir Geoffrey Wilkinson.
Bis(Cyclopentadienyl) Compounds of Ti, Zr, V, Nb and Ta. J. Am. Chem. Soc. **1954**, 76 (17), 4281
- **1961:** Boulder Scientific is incorporated in Boulder, CO.
- **1972:** John Birmingham shifts his focus to Boulder Scientific full time and begins making custom chemicals for catalog and industrial chemical companies.
- **1979:** Spurred by continued growth, Birmingham purchases a 10-acre parcel in Mead, CO to develop a manufacturing plant.

Who We Are Today

Custom Specialty Chemicals

Advanced Catalysts

- Polyolefin Industry

Electronic Materials

- ALD and CVD Precursor

Performance Materials

- Defense and Aerospace Industry

Fine Chemicals

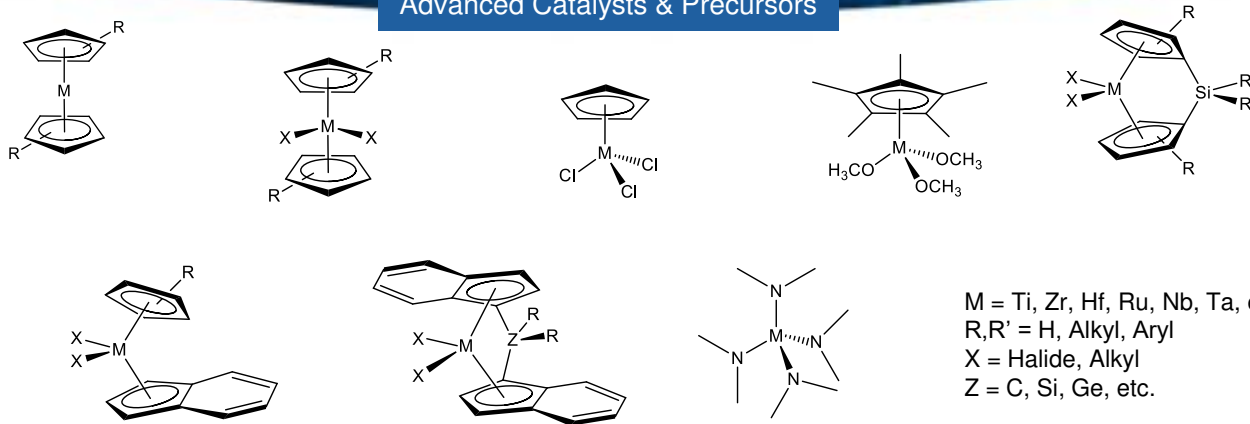
- Research and Development
- Life Sciences

- Over 50 years of experience in commercial manufacturing of organometallic compounds
- >200 full time employees and growing
- Reactor capacity up to 2000 gallons (7500L)

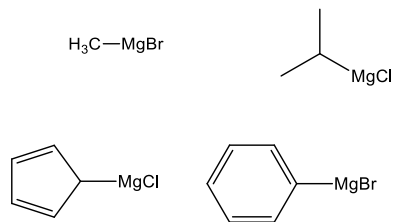


BSC Product Offerings

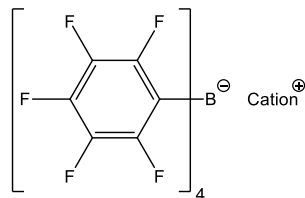
Advanced Catalysts & Precursors



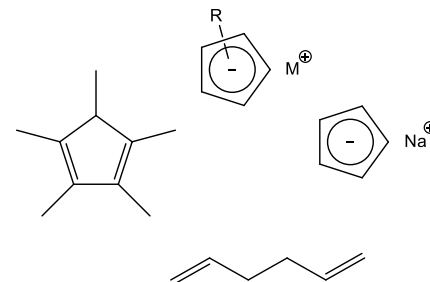
Grignard Reagents



Boron Compounds

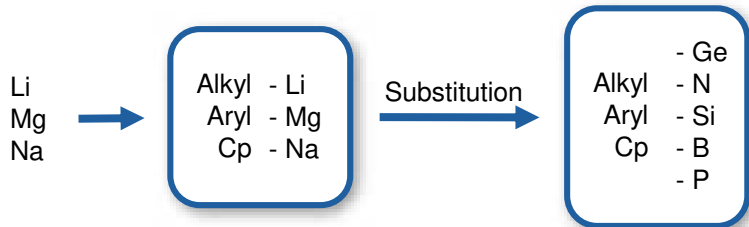
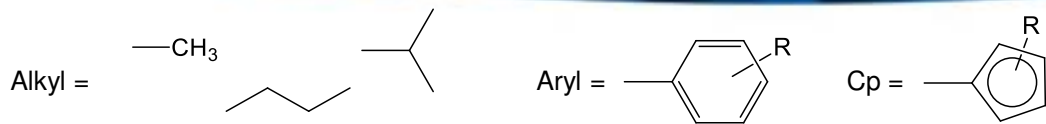


Organic Compounds

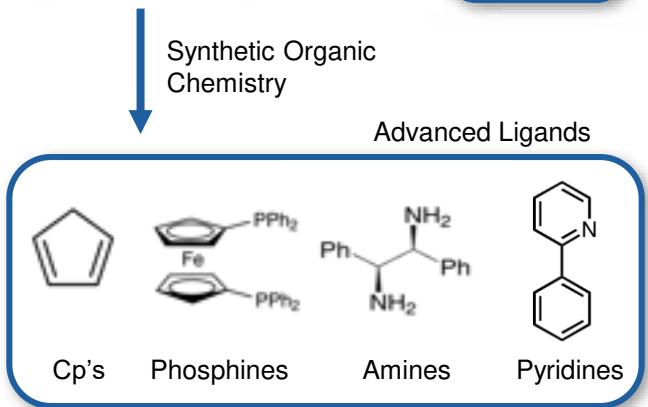


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BSC Core Capabilities



BSC Core Capabilities:
Organic chemistry
Pyrophoric reagents
Commercial scale manufacturing
of air/moisture sensitive
compounds
Solid Supported Catalysts



Solutions for Your
Custom Chemical
Needs

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Facilities in Northern Colorado

Mead

R&D, Pilot Plant,
Manufacturing,
Analytical

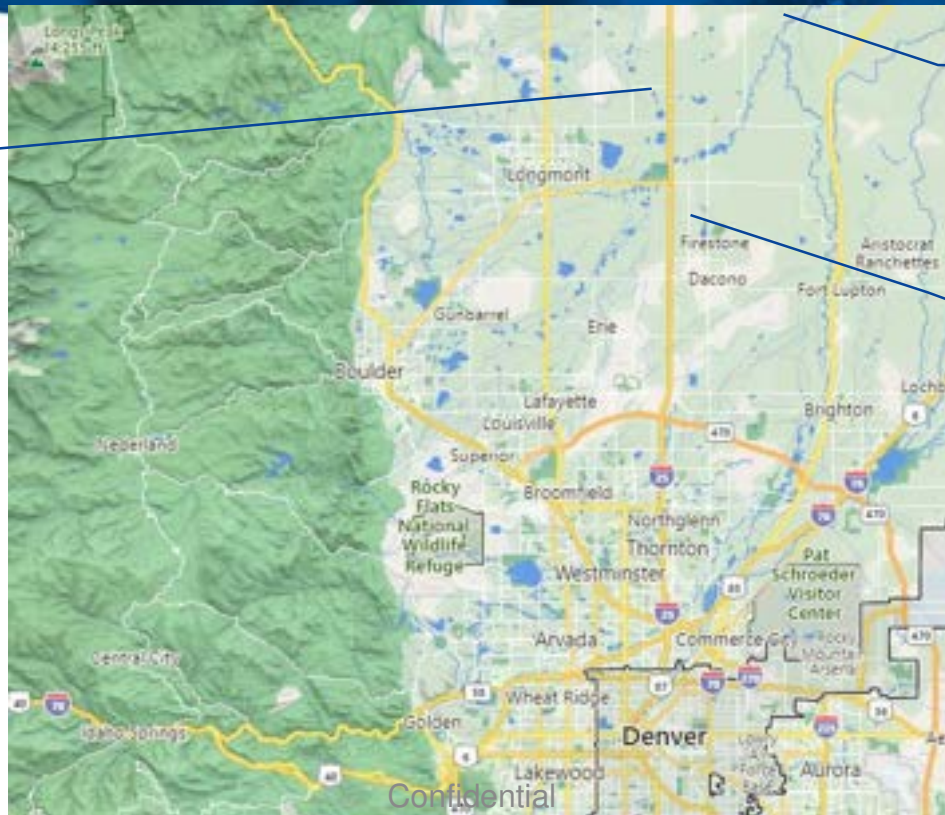


Milliken

107 Acres Expansion
Site for Future
Production

Longmont (HQ)

R&D, Manufacturing,
Corporate Office



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Facilities in Northern Colorado



Production Capabilities

- Glass-lined & alloy reactors (10 gal to 2,000 gal)
 - 10 Glass lined reactors, 50-2000 gal
 - 12 Hastelloy reactors, 400-1000 gal
 - 4 SS reactors, 50 - 400 gal
- Variety of Filtration Technology & Centrifuges
- Commercial scale short path & fractional distillation
- Handling of air/moisture sensitive materials at commercial scale
 - Liquid and solid packaging
 - Pyrophoric materials
 - Multiple glove boxes and Hoods in R&D and Production



Equipment/Expertise for Challenging Chemistry

Hastelloy Reactors



Hastelloy Filter Dryers



Hastelloy Systems

- ✓ Improved Thermal Stability (-30 to 200 °C)
- ✓ Pitting & Corrosion Resistant
- ✓ Stress Corrosion Cracking Resistant
- ✓ Strength at high and low temps
- ✓ Multiple Chemical Resistance
 - ✓ Bases
 - ✓ Acids (HCl, HBr, Nitric, Phosphoric & Sulfuric)
 - ✓ Grignards
 - ✓ Oxidizing Corrosives

Hastelloy, filter dryers

- ✓ Airless packaging
- ✓ TCU controlled heated drying
- ✓ Agitated (or non) vacuum drying
- ✓ Eliminates packaging yield losses

Hastelloy Filter Dryers



Longmont Expansion



R&D Laboratories



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Analytical Equipment

Analytical Instrumentation

- Two Bruker 300 MHz NMR
- Bruker 400 MHz NMR
- Agilent GC-FID (7890B, 6890N, 6850)
- Agilent 7890A GC /5975C MSD (GC-MS)
- Agilent GC-TCD (7890B and 6890N)
- Agilent 1100 Series HPLC; HPLC-TOF
- Thermo Scientific Nicolet iS5 FTIR ATR
- Beckman Coulter DU 800 (UV/VIS)
- Karl Fischer
- Perkin Elmer ICP-OES
- Agilent ICP-MS
- Malvern Particle Size Analyzer
- Headspace Analyzer
- Crystal 16 System

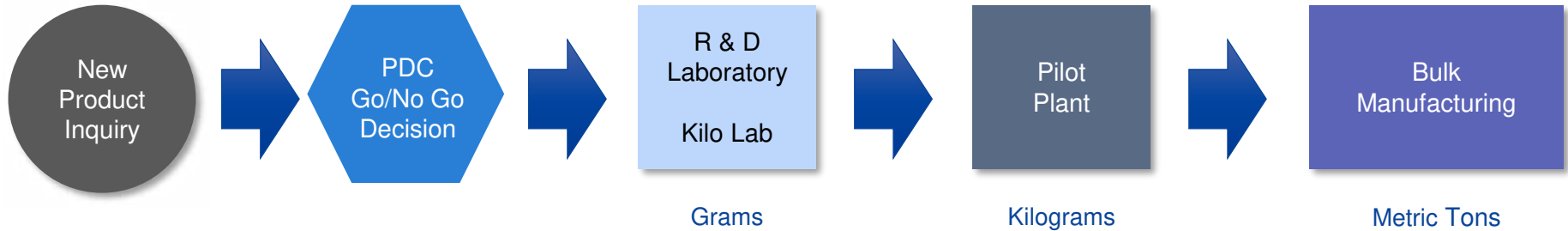
Process Safety Equipment

- DSC & TGA
- RC-1 Calorimeter
- ARC Spectrometer



Specialty Custom Manufacturing

New Product Scale-Up Work Process



- Typical Work Process: Close collaboration with customers on development
- Scale Up from R&D to Commercial Quantities
- Air & Moisture-Sensitive Compounds
- Pyrophoric Materials
- Multi-Step Syntheses

Custom Packaging and Shipping



- Solids Packaging, Drums, Cylinders, ISO Tankers
- Global Shipments
- Customer Specific Packaging and Shipping

Environmental Health & Safety



- ChemStewards Certified (SOCMA) Tier 3
- Member of the Colorado Green Business Network – formerly CDPHE Environmental Leader Gold Award (since 2012)
- Sustainability Platforms
 - Ecovadis
 - CDP

Culture





Boulder Scientific Company™

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ISO 9001:2015
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