Lacamas Laboratories

LACAMAS LABORATORIES

FINE CHEMICALS

MADE IN THE USA

Lacamas Laboratories

Company History

- Established in 1985
- Founded by Dr. Allen Erickson, current President & CEO
- First products included DIBOC and pharmaceutical intermediates
- Growth and expansion every year since inception
- Privately owned with solid financial resources (self-sufficient for capital needs)

Lacamas Laboratories

Site and Facilities

4.5 Acre (1.8 Hectares) Site

3 Manufacturing Buildings

12600 ft^2 (1170 m^2)

Office and Laboratory Facilities

4000 ft^2 (370 m^2) Laboratory Area

3 Warehouses 19000 ft^2 (1760 m^2)

Raw Materials

In-Process

Finished Product

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Production Manufacturing Capabilities

- **8 Production Lines of 1000 and 2000 gallon reactors (4000 and 8000 L)**
  - **>32,000 gallons (120,000 L) GL, Hastelloy & SS reactors**
  - **Hydrogenation: 500 gallons up to 300 psi**
  - **Hastelloy C and Tantalum Overheads**
  - **Hastelloy C Centrifuges**
  - **Stainless steel tray dryers and glass-lined blender**
  - **Heating and cooling from -40 to >200°C**
  - **High capacity vacuum to <1 Torr**

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Distillation Capabilities

Continuous Fractional Distillation

Engineered Packing

26 Theoretical Plates

High resolution

High efficiency

High capacity

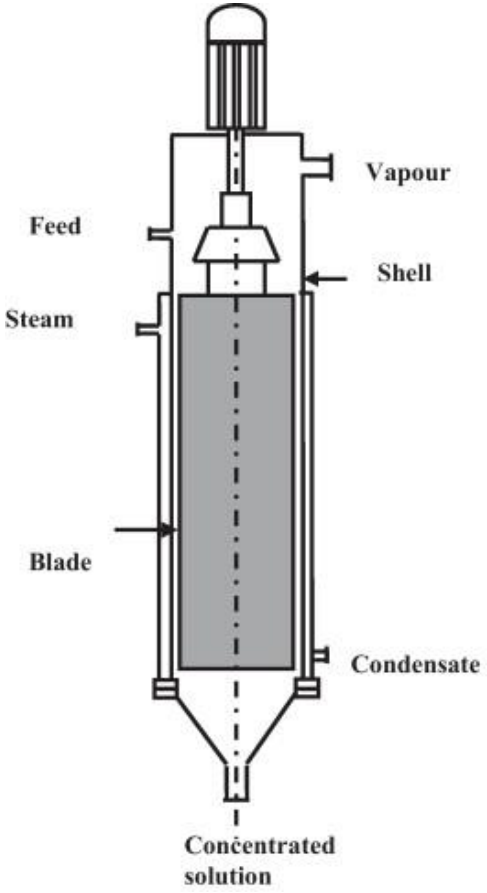
Thin Film Distillation

Thermally sensitive materials

Short contact times

High vacuum, <1 Torr

High capacity, 8 kg per Minute



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Lacamas Dryer Capability

- **2 stainless steel (316 SS) tray dryers**
  - **500 kilogram capacity**
  - **300 kilogram capacity**
- **Double cone tumble dryer**
  - **400 to 700 kilogram capacity**

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Quality Systems

- **Lacamas maintains effective quality systems that:**
  - **Meet customer requirements**
  - **Focus on continuous improvement**
- **Quality Unit**
  - **Quality Assurance**
    - **OOS/Deviation Reporting**
    - **CAPA Program/Internal Audits**
    - **Supplier Qualification**
    - **Change Control Program**
    - **Validation Program**
  - **Quality Control**
    - **Raw material, Intermediate and final product testing**
    - **Analytical methods development**
    - **Full analytical capabilities (GC, HPLC, NMR)**

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Technical Expertise

- **R&D and Process Development**
  - **Laboratory process optimization (up to 5 Liters)**
  - **Pilot front-run (400 Liters)**
  - **Commercial production (up to 8,000 Liters)**
- **All batch records go through multiple process reviews before transfer to the plant**
- **Chemical engineers and process chemists on staff work together to scale up new processes**

Lacamas Laboratories Safety Program

- **Employee Involvement and Training:**
  - Monthly EHS/Regulatory Training is required for all plant and lab personnel. (LOTO, HAZCOM, Hazardous Waste, First Aid, AED CPR, Chemical Handling, etc)
  - Process Safety Reviews
  - Monthly operator-led Joint Health and Safety Committee meetings.
- **Change Control and Hazard Analysis Program**
- **Laboratory-Scale Safety Analysis**

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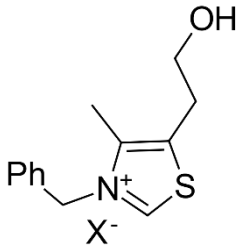
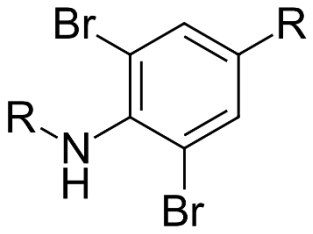
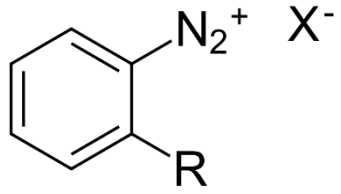
Synthetic Strengths



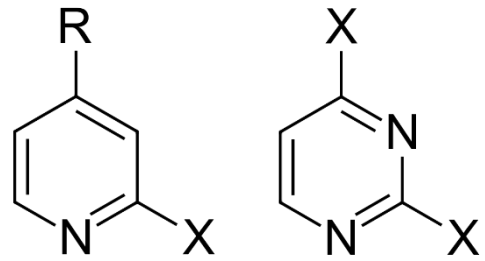
Substituted thiazoles



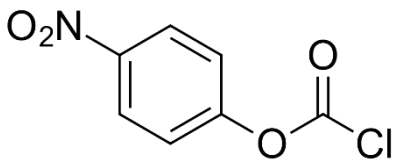
Brominations



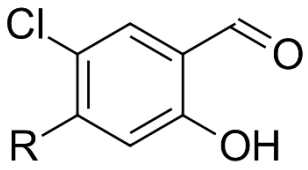
Diazo compounds



Heterocycles



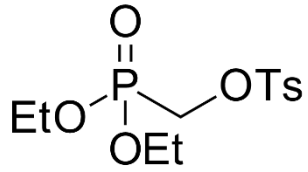
Chloroformates



Halogenation/ formylations

RMgX

Grignard reagents



Phosphorus compounds

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Lacamas: your ideal manufacturing partner

- **High-quality**
- **Fast**
- **Flexible**
- **Responsive**

Visit us online

www.LacamasLabs.com

For any questions or inquiries please contact:

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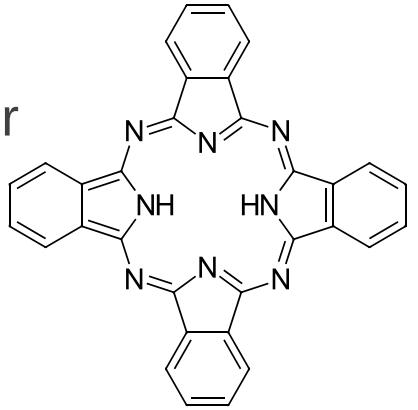
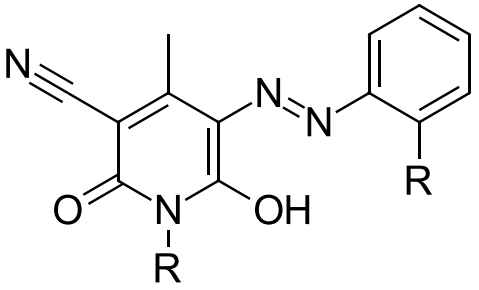
Dye Chemistries

- Phthalocyanine-based dye
  - Developed manufacturing process for unique phthalocyanine dye precursor
  - Developed manufacturing process for phthalocyanine-metal dye
  - Unusual non-polar structure required successful R&D effort



Phthalocyanine-based dye

- Azo-based dye
  - Developed diazotization-based process
  - Safely performed multiple times per year
  - Efficient manufacturing route provides high-quality product



Azo-based dye

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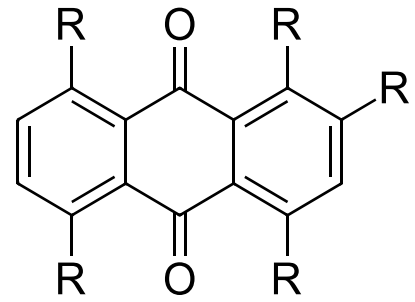
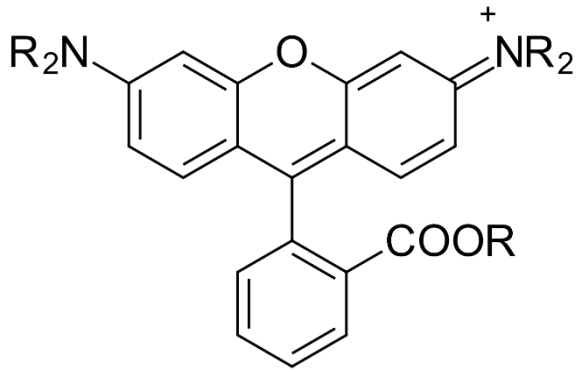
Dye Chemistries

- Anthraquinone-based dye
  - Developed 3 step sequence, including high-throughput halogenation
  - Customer requirements drove quality improvements on purity
  - Tight specifications required innovation for efficient purification



Anthroquinone-based dye

- Rhodamine-based dye
  - Process R&D succeeded in handling physical property challenges
  - Met narrow specifications on inorganic salts
  - Produced both metric tons of precursor and final product



Rhodamine-based dye

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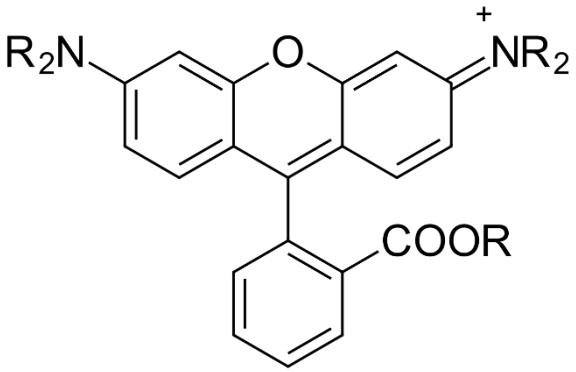
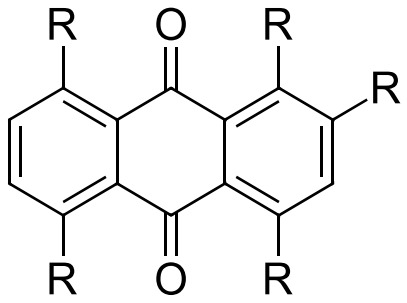
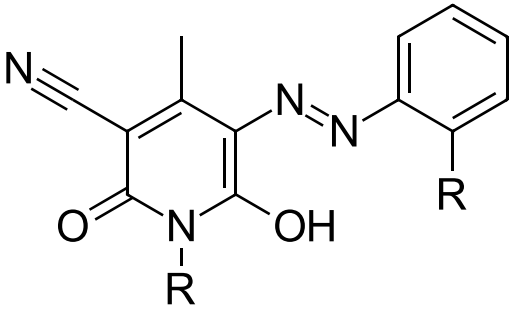
Lacamas Dye Expertise



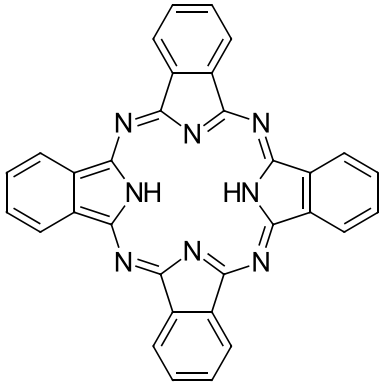
Rhodamine-based dye



Anthroquinone-based dye



Azo-based dye



Phthalocyanine-based dye

- Decades of experience manufacturing complex, high-purity dyes
  - Metric ton quantities per year
  - Multi-step syntheses for each product
  - Tight specifications on product quality and inorganic impurities