

CHIRAL TECHNOLOGIES INC

DAICEL GROUP

Innovation Begins Here

Chirality

Asymmetric
Enzymatic

.

Is There a Better Way?

Chiral Technologies Inc.

- Discovery
 - High volume of candidates
 - Chirality of drug TBD

Key: Delivery of material

- Process Development
 - High attrition rate
 - Chirality is known

Key: Speed

- Clinical Trials
 - Long-term focus
 - Process feasibility

Key: Scalability

- Commercial Production
 - Process robustness
 - Equipment availability

Key: Cost

Chiral Technologies Inc.

- Our only focus is enantiomeric purity
 - Custom purification from mgs to 100 kgs
 - Discovery through Phase II Trials
- Two Case Studies to exemplify capabilities
 - Process Development
 - Clinical Trials



Case Study #1

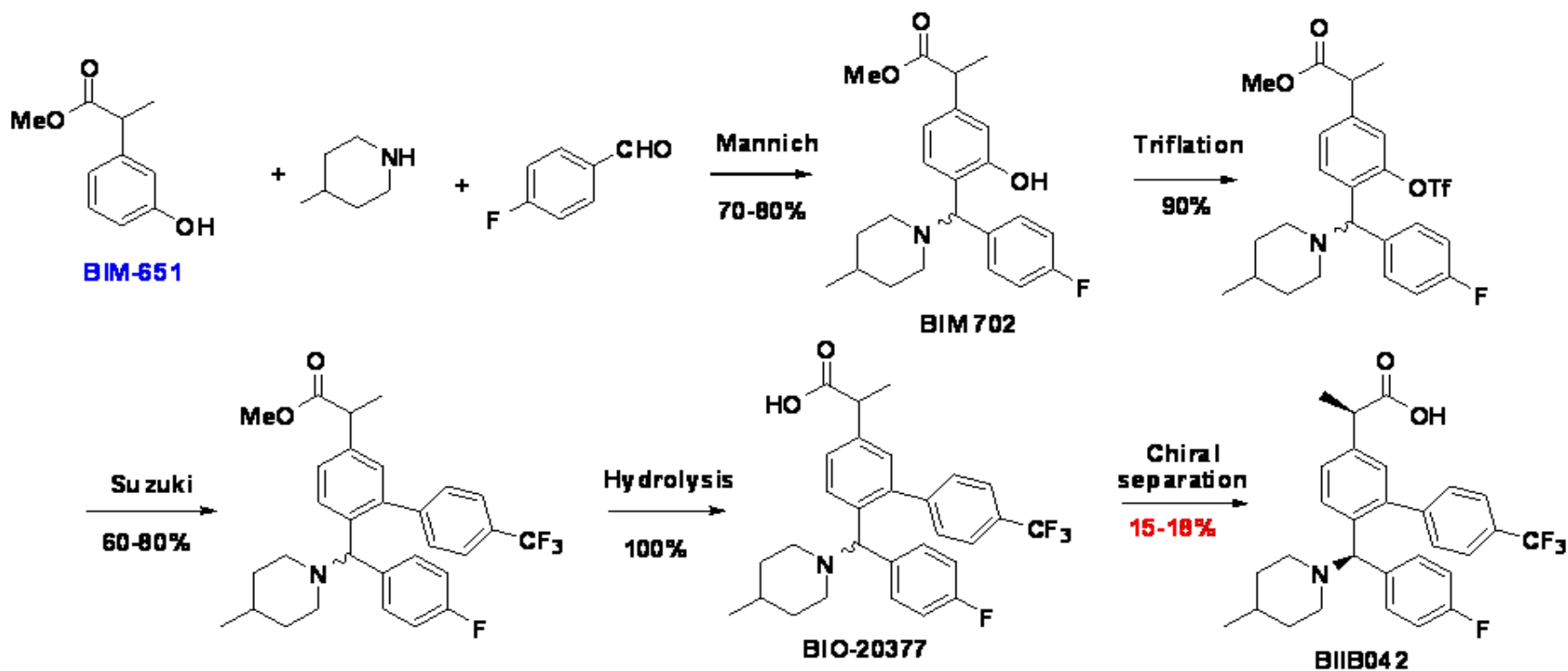
- Process Development
- Initial focus was on API
 - Current process; classical resolution
 - Slow process, high cost, not scalable
- Reviewed prior intermediates
 - Developed process to obtain >98%ee
 - Faster than classical resolution
 - 25% of the cost



Case Study #2

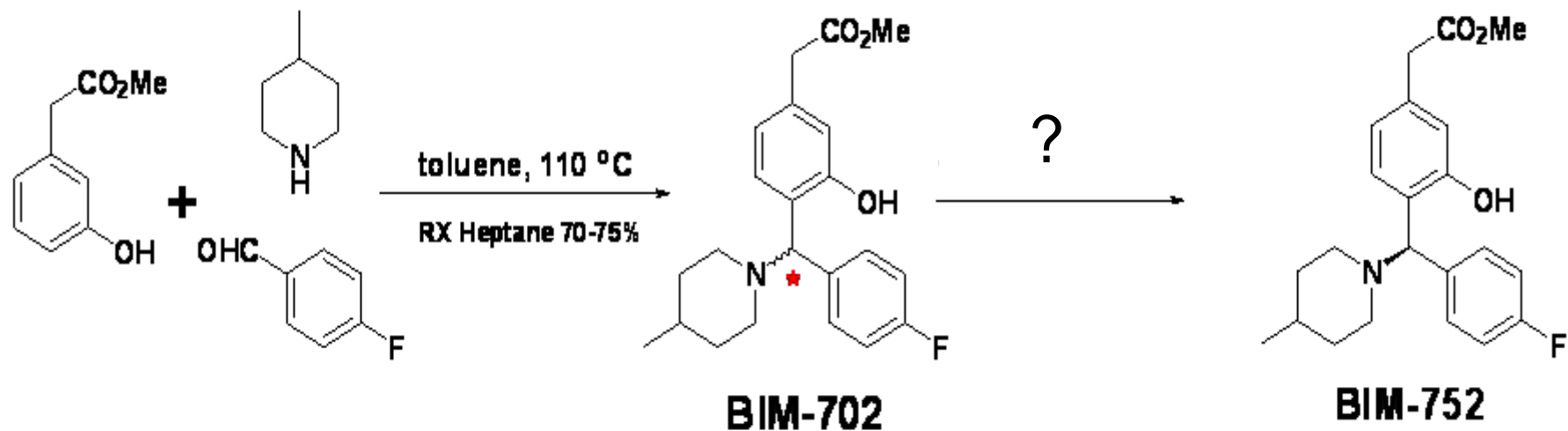
- Biogen Idec Drug

Initial Drug Discovery Approach to BIIB042



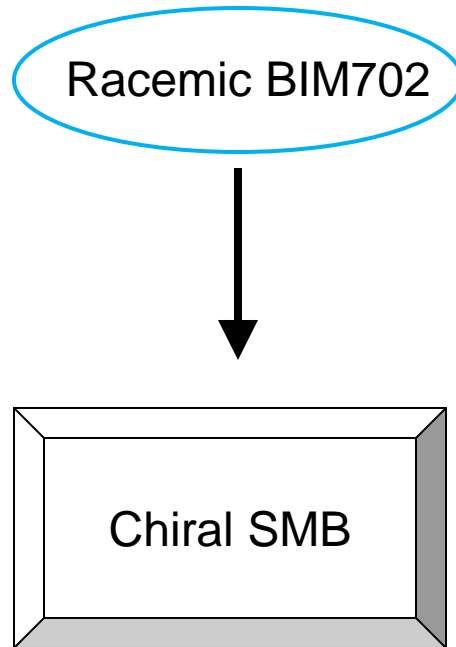
The Mannich reaction established the framework for **BIIB042** in the first step producing **BIM-702**, and chiral chromatography was employed to separate the four stereoisomers.

Formation of First Chiral Center



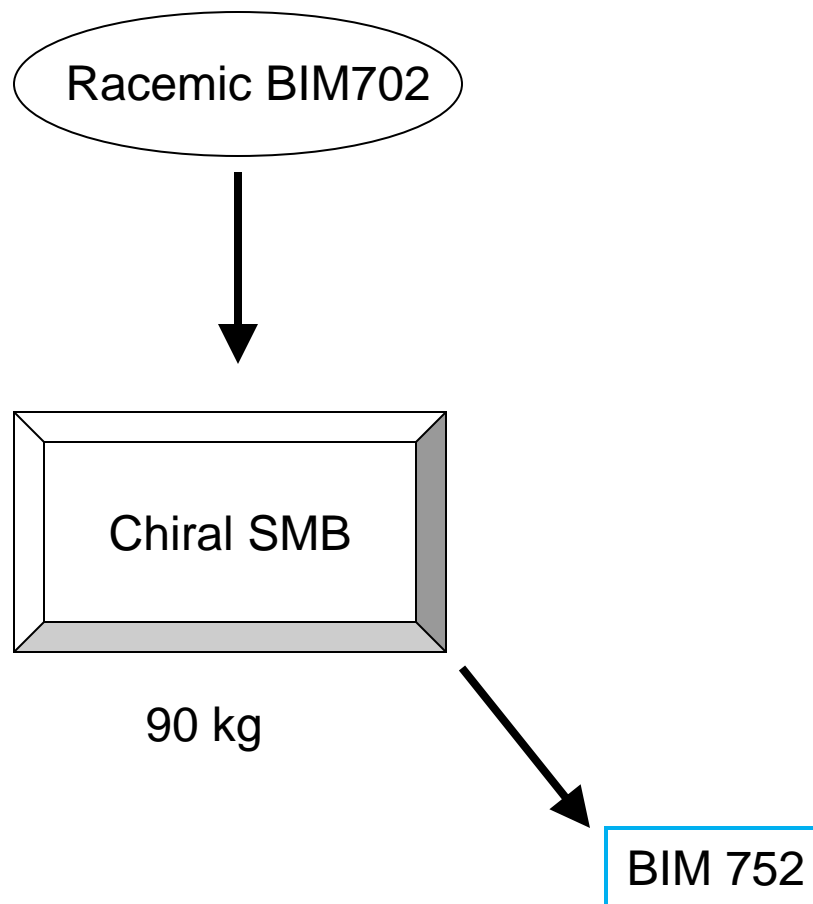
- Attempted both Enzymatic and Classical Resolution to no avail.
- Developed SMB route to obtain >99%ee BIM-752
- Ran 90kg campaign to prove it out

Potential SMB Process



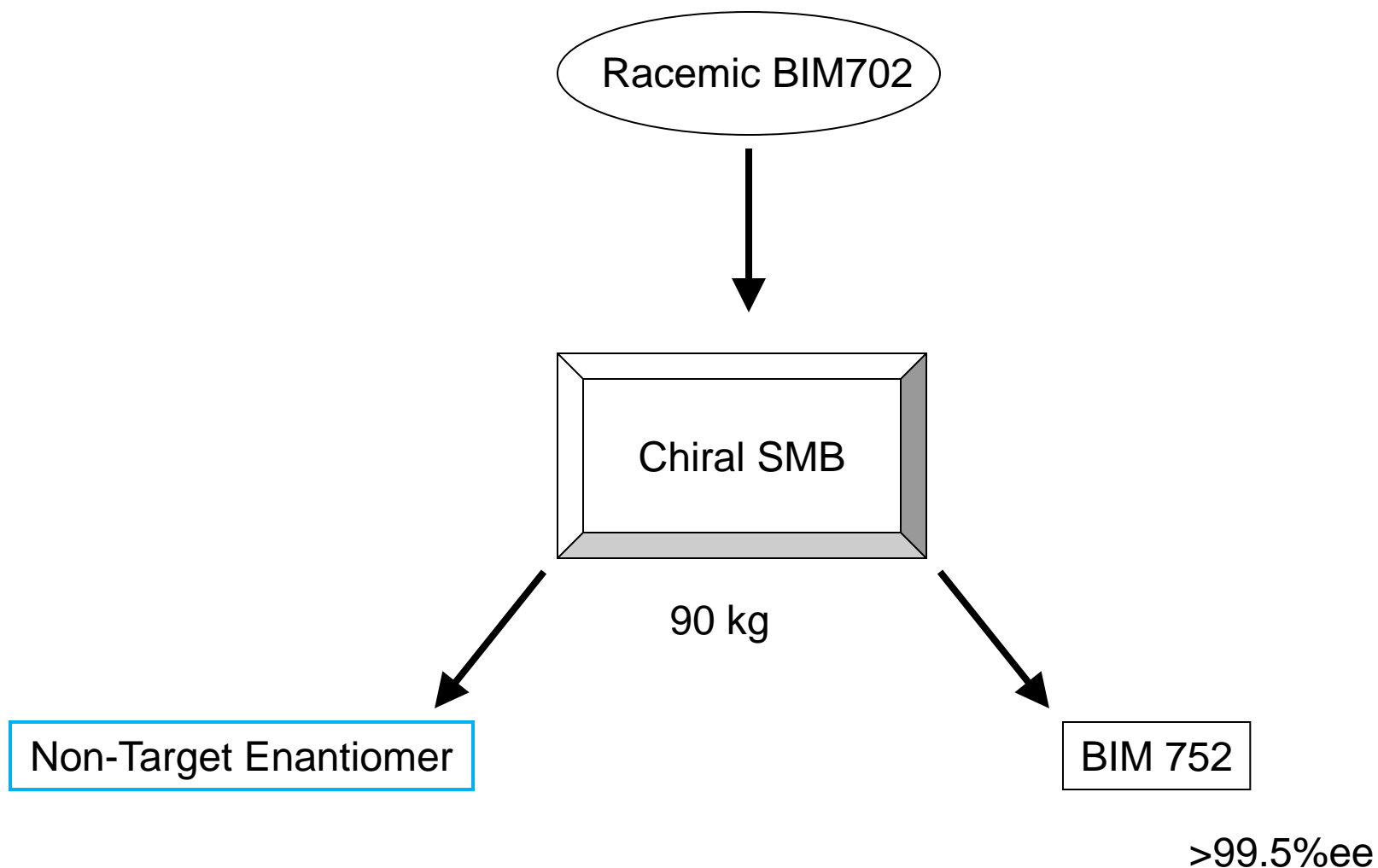
90 kg

Potential SMB Process

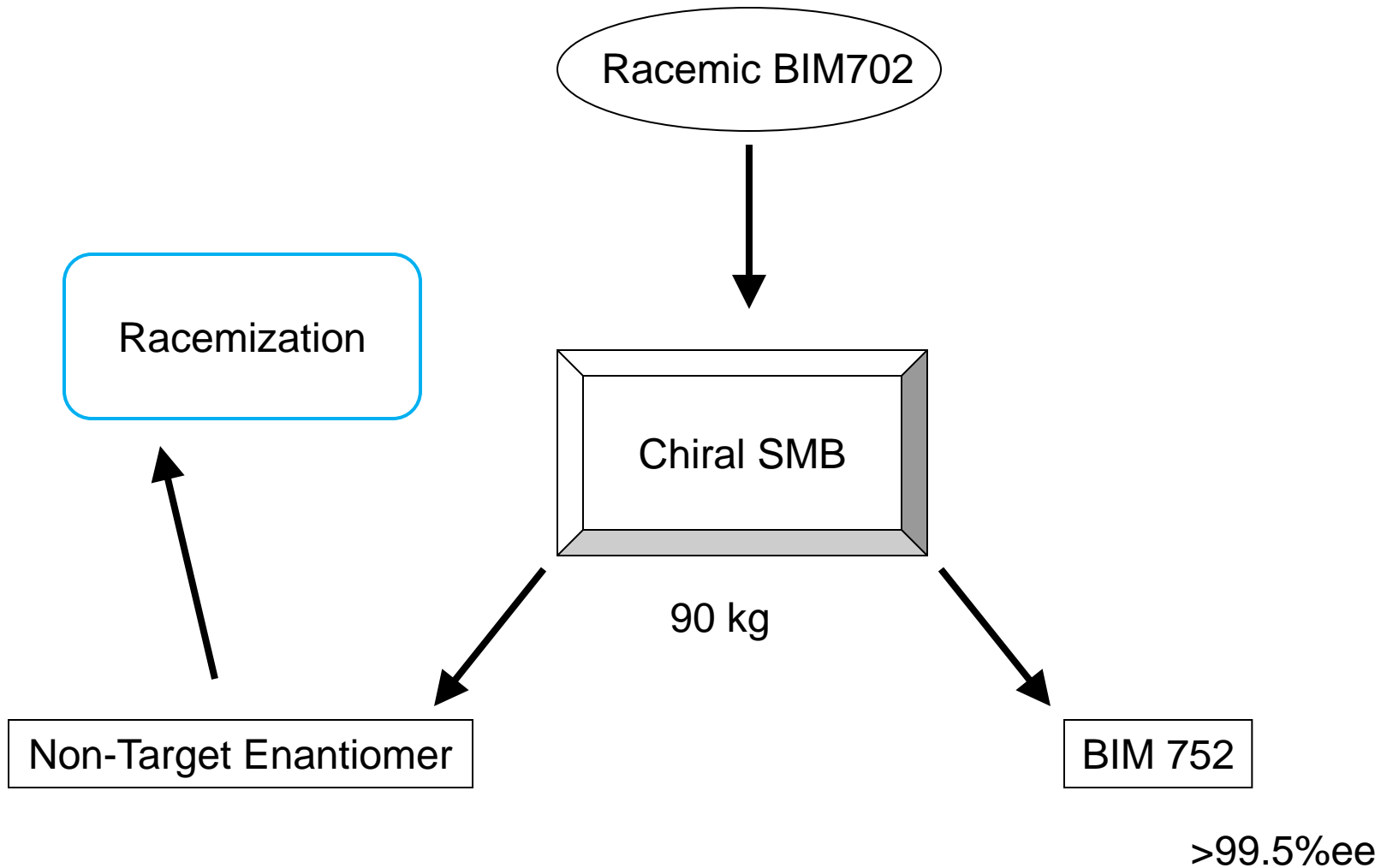


>99.5%ee

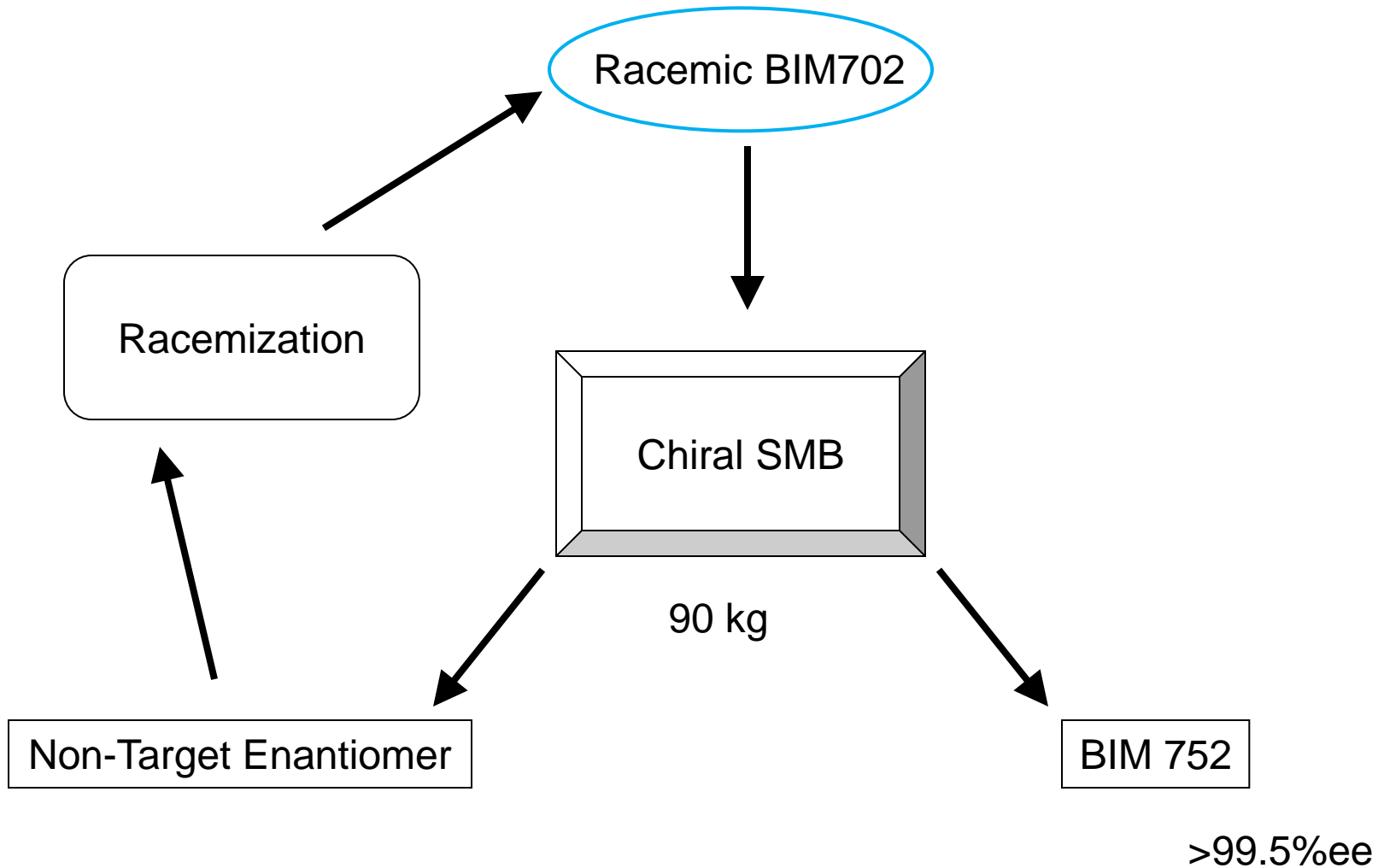
Potential SMB Process



Potential SMB Process



Potential SMB Process



Global Capabilities





- Commercial-scale SMB system at
- Ampac Fine Chemicals plant in Sacramento, CA