Green Chemistry: A New Outlook on Synthesis

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What do we care about in Chemistry Research?

- Money!!
- Speed!!
- Large Quantities!!
Green Chemistry:

Scientists are very conscious of the world around them…
Indium Mediated Allylation: One Pot Synthesis

- Reactants:

\[ \text{H}_2\text{C} = \text{C} - \text{C} - \text{Br} \quad + \quad \text{In(s)} \quad + \quad \text{H}_3\text{C} - \text{C} - \text{H} \]

- It’s all in the broth of the stew!!
2 step process:

- **Step 1**: Formation of the Intermediate

[Chemical reactions and structures are shown in the diagram.]

Chan 1.  
Anne 2.  
Araki 3.  

Anne Araki
Step 2: Formation of the Product
Research as a storybook:

- **Grignard**: Mg in dry ether
- **Araki**: Indium mediated allylation to ketones and aldehydes creates high yields
- **Whitesides**: Carbohydrate synthesis
- **Chan**: Oh My Gosh!! It can be run in water!!
  - A.k.a. aqueous conditions
Chan: A Synthetic Application

D-mannose → 2 Steps → (+) KDN

Diagram showing the transformation of D-mannose into (+) KDN through two steps.
Conclusions:

- Money -- Water is an inexpensive solvent!!
- Speed -- Intermediate generated in minutes!!
- Large Quantities -- 98-100% yield
- Environmentally friendly -- Lessen industrial waste
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