

Mechanochemical Coupling

A **coupling reaction** is a general term for a reaction where **two fragments are linked together** using a metal catalyst. Mechanochemistry has increasingly become an important technique in optimizing current coupling procedures.

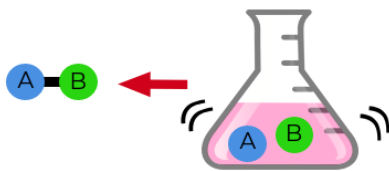
Mechanochemical techniques form bonds between the two components by applying mechanical force such as grinding.

Traditional techniques involve solution chemistry, where the two components are dissolved in the same solution and then react.

Mechanochemistry has improved Heck Coupling

Heck coupling involves the formation of a carbon-carbon bond between two fragments with a palladium catalyst.

Traditional Chemistry



Around 96%.



High Yields



Eight to twelve hours.



Short Reaction Time



The solution was washed through a column to separate the desired product.



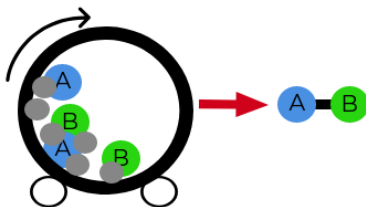
Easy Purification



Heck coupling is used to make:



Mechanochemistry



Frequently greater than 90%.

Forty-five minutes to an hour

The product was washed off the ball mill and filtered.

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Zhu, X.; Liu, J.; Chen, T.; Su, W. *Appl. Organometal. Chem.* **2012**, 26, 145 - 147.
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While traditional and mechanochemical synthesis have significant yields, the latter has shorter reaction times and less additional purification steps. Mechanochemistry has demonstrated potential for improving current procedures for organometallic catalytic reactions.