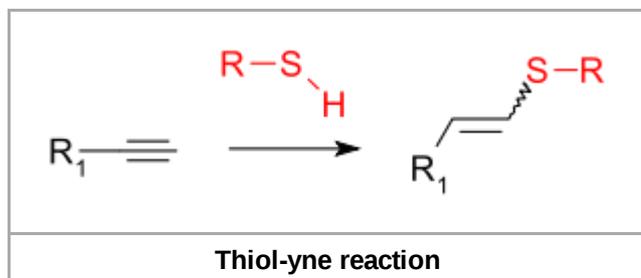
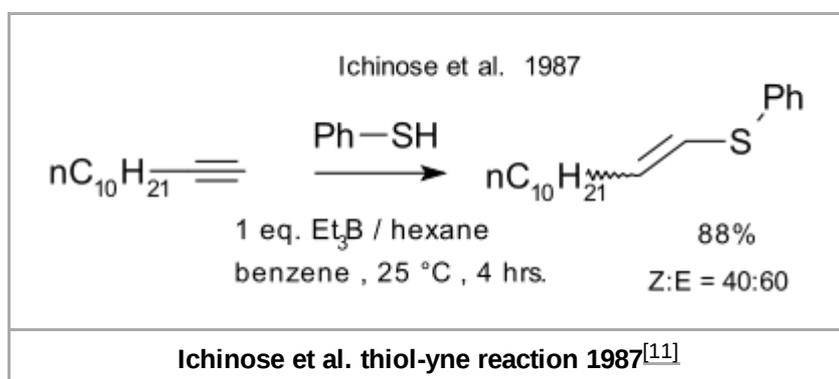


# Thiol-yne reaction

The **thiol-yne reaction** (also known as **alkyne hydrothiolation**) is an organic reaction between a thiol and an alkyne. The reaction product is an alkenyl sulfide.<sup>[1][2]</sup> The reaction was first reported in 1949 with thioacetic acid as reagent<sup>[3][4]</sup> and rediscovered in 2009.<sup>[5]</sup> It is used in click chemistry<sup>[6][7][8]</sup> and in polymerization, especially with dendrimers.



This addition reaction is typically facilitated by a radical initiator or UV irradiation and proceeds through a sulfanyl radical species. With monoaddition a mixture of (*E/Z*)-alkenes form. The mode of addition is anti-Markovnikov. The radical intermediate can engage in secondary reactions such as cyclisation.<sup>[9][10]</sup> With diaddition the 1,2-disulfide or the 1,1-dithioacetal forms. Reported catalysts for radical additions are triethylborane,<sup>[11]</sup> indium(III) bromide<sup>[12]</sup> and AIBN.<sup>[13]</sup> The reaction is also reported to be catalysed by cationic rhodium and iridium complexes,<sup>[14]</sup> by thorium and uranium complexes,<sup>[15]</sup> by rhodium complexes,<sup>[16][17][18]</sup> by caesium carbonate<sup>[19]</sup> and by gold.<sup>[20]</sup>



Diphenyl disulfide reacts with alkynes to a 1,2-bis(phenylthio)ethylene.<sup>[21]</sup> Reported alkynes are ynamides.<sup>[22]</sup> A photoredox thiol-yne reaction has been reported.<sup>[23]</sup>

## Polymer chemistry

In polymer chemistry, systems have been described based on addition polymerization with 1,4-benzenedithiol and 1,4-diethynylbenzene,<sup>[24][25]</sup> in the synthesis of other addition polymer systems<sup>[26]</sup> in the synthesis of dendrimers,<sup>[27][28][29][30]</sup> in star polymers,<sup>[31][32][33][34]</sup> in graft polymerization,<sup>[35]</sup> block copolymers,<sup>[36]</sup> and in polymer networks.<sup>[5][37]</sup> Another reported application is the synthesis of macrocycles via dithiol coupling.<sup>[38]</sup>

## See also

- Thiol-ene reaction

- [Click chemistry](#)
- [Radical addition](#)
- [Michael Addition](#)

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