

Abstract

Recently, click chemistry reactions, which are reactions that are able to generate products quickly and reliably by joining small units together, have been gaining attention. Such reactions have many advantages, such as being stereospecific and using easily available chemicals. One such reaction is the one-pot synthesis of 1,2,3-triazoles from alkynes and azides as starting materials. This reaction has many applications in Chemistry, Biology, Materials Sciences, and Pharmaceuticals due to its convenience. However, one drawback is the high activation energy required for the cycloaddition to occur. As such, Ruthenium catalysts have been employed for catalytic purposes. However, due to the expensive nature of Ruthenium catalysts, we are investigating two possible improvements to the reaction. Firstly, the feasibility of encapsulating such catalysts in mesoporous iron oxide nano/ microspheres will be investigated. The microspheres will allow for efficient reuse and recyclability of the catalyst due to their magnetic properties. A second goal would be to optimize the catalytic process when such nano/ microspheres are in use. This will be done by varying the physical and chemical environments. Our group has found that these nano/microspheres offer a very viable method to achieve catalyst recyclability, and that generally polar/ protic conditions give the highest yield. Recommendations based on this study can be used to optimize the synthesis of 1,2,3-triazoles in various industries.