Biaryls, compounds containing two directly connected benzene rings, frequently feature in pharmaceuticals and agrochemicals as well as forming the core of many functional materials (for example LEDs, liquid crystals, conducting polymers).

In our research, a highly efficient new protocol for C-Te bond formation leading to symmetrical and unsymmetrical diaryl tellurides has been developed.

The synthesis of symmetrical diaryl tellurides employed aryl iodides and elemental tellurium as starting materials in the presence of KOH. It is a one-pot reaction without using any catalyst. Utilizing this new protocol, a variety of aryl and heteroaryl iodides are reacted with elemental tellurium to afford the corresponding diaryl tellurides in good to excellent yields.

While the synthesis of unsymmetrical diaryl tellurides involves the formation of an intermediate diaryl ditelluride $\text{Ar}_1\text{TeTeAr}_2$, which is directly used in the following copper-catalyzed coupling reaction without purification, leading to the product unsymmetrical diaryl telluride $\text{Ar}_1\text{TeAr}_2$.

These synthetic diaryl tellurides are used as the starting materials to generate biaryl compounds under exceptionally mild conditions. The biaryls are produced by the detelluration reaction on the diaryl tellurides using palladium (0) which is generated from commercially available and low cost palladium chloride and a base sodium carbonate.

The new method to generate biaryls will lead to a more benign alternative to the field of pharmaceuticals in the synthesis of biaryl containing molecules.