The Grignard addition reaction is known to be a reversible process with allylic reagents, but so far the reversibility has not been demonstrated with other alkylmagnesium halides. By using crossover experiments it has been established that the benzyl addition reaction is also a reversible transformation. The retro benzyl reaction was shown by the addition of benzylmagnesium chloride to di-tert-butyl ketone followed by exchange of both the benzyl and the ketone moiety with another substrate. Similar experiments were performed with phenylmagnesium bromide and tert-butylmagnesium chloride, but in these two cases the Grignard addition reaction did not show any sign of a reverse transformation.