The synthesis and isolation of compounds with a silicon-silicon triple bond was no more than a dream, one that was finally realized in 2004. The chemistry of disilynes also represented the beginning of a new area of main group chemistry research. The chemistry of stable silyl, germyl and stannyl radicals will be also reported together with their possible applications (for example, radical battery, etc). As one of the most important developments, the potential application of stable radicals and polysilynes in the design of new advanced materials will be presented.