# The role of carbon in the genesis of Carlin-type gold deposits

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Whether carbon has played an active or a passive role in the genesis of Carlin-type gold deposits has been debated since the discovery of these deposits in the 1960s. Recent experimental data suggest that activated carbon, both synthetic and natural, absorbs gold from a bisulfide solution at temperatures from 25°C to 75°C. Comparison of thermodynamic data for gold and other metals suggests that gold should also be absorbed from bisulfide solutions by active carbon at hydrothermal temperatures. Given the likely presence of active carbon at the time of mineralization in what are now ore zones, it is suggested that carbon *did* remove gold from solution and acted as a temporary storage location before the gold was incorporated into arsenian pyrite.

It is suggested that gold was sorbed onto the margins of active carbon where the carbon structure was "frayed," thus providing more surface area. This is borne out in part by stable isotope studies of active and non-active carbon in the Carlin trend. Preg-robbing carbon typically has a low crystallinity and low $\delta^{13}C$ values, typical of many preg-robbing carbons in other ore deposits. In the Carlin trend, the intrusion of the Goldstrike stock matured this organic carbon, resulting in higher crystallinity and higher $\delta^{13}C$ values. However, in zones of weathering, previously-matured carbon (as measured by the $\delta^{13}C$ values) can again become preg-robbing, probably because of the surface effects of the weathering process.