Genetic model formation of bimetsomatic skarns from Austalia

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The Marulan South Skarn association has occurred along the southern contact of I-type Glenrock granodiorite adjacent to late-Silurian Bangonia limestone. It has formed during two different T-t paths stages. At first high temperature prograde stage the calcic limestone has replaced by garnet, clinopyroxene, wollastonite and vessuvianite. The second low temperature retrograde stgae has charactrized by scattered hydroxide silicates such as prehnite and flourappophylite.
This type of skarn is very well displays a reduction environment of W-skarn and Au-skarns, minralogically and geochemically. The geochemistry of exoskarns shows that many elements such as Cu, Al, Fe, Zr, Zn, S, Mn and REE are added to the primary pure limestone. Very small amounts of K, Na and Rb are transferred as well. Mass balance calculation at constant volume indicates that CO^2, Ca and Sr are subtracted from the parent limestone.

Geochemistry of gold of metamorphic rocks

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The results of our investigations of gold distribution in the Archean metamorphic complexes (Russia) are shown (ppb).

	Gold in metamorphic series		
Facies	**Can,**	**Bug,**	**Kola,**
Rocks	**n=203**	**n=179**	**n=131**
Granulitic			
Gneisses,	12.18	20.41	20.6
leucogranulites	16.8	21.7	25.6
Bipyroxene gneisses	14.62	-	55.3
Aluminiferous gneisses			
Diaphthorites			
Amphibolite	3.32	3.61	2.97
Epidotic amphibolite	9.73	8.65	20.2
Green schists	8.03	-	-
Hydothermal alterated rocks	31.5	-	77.6
Ultrametamorphites			
Charnockite	1.4	-	-
Migmatites	6.89	-	9.2
Granites	4.49	8.5	9.0

The most ancient supercrustal metamorphic rocks of granulitic facies have increased concentrations of gold by comparison with clark. Charnockite-forming, granitization, migmatization and diaphthoresis in granulitic series reduce to chemical substruction of gold. This series could be one of the sources of the metal for proterozoic and phanerozoic deposits.

Concentrations of gold in zonal metamorphic complexes of metapelites and metabasites of proterozoic and phanerozoic age are 2-5 times more than the contents of the metal in aleurite-argillaceous schists of zones of kata- and metagenesis. These concentrations have the discrete distribution in facies serieses of metamorphic rocks. The most low concentrations of metal are features of rocks of amphibolite facies. Double excess of gold concentrations is typical for green schists and for rocks of epidotic amphibolite facies by comparison with rocks of amphibolite facies. Metal accumulation occurs in the rocks of border conditions of metamorphism (borders between facies, subfacies). Gold is introduced into metamorphism area with deep fluids.