

New Tetragonal $\text{ReGa}_{5-x}\text{M}_y$ (M= Sn, Pb, Bi) Single Crystals Grown from Delicate Electrons Changing

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Supporting Information

Table S1. Anisotropic displacement parameters..... **S2**

Table S2. Scanning electron microscopy..... **S3**

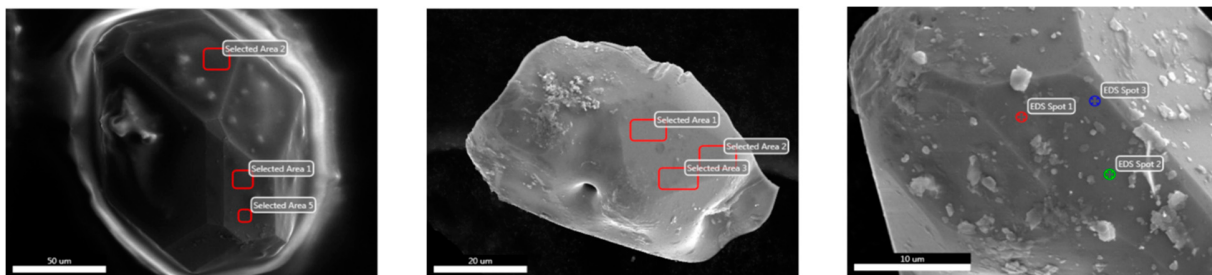
Figure S1. Powder X-ray diffraction patterns..... **S4**

Figure S2. Heat capacity measurements..... **S5**

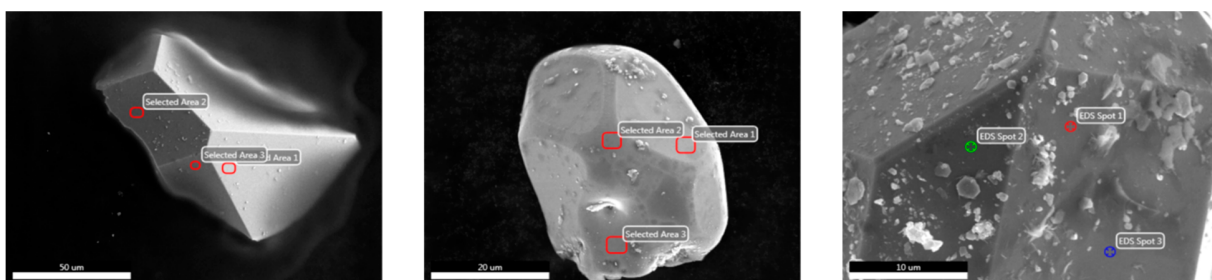
Table S1. Anisotropic displacement parameters for $\text{ReGa}_{4.96}(\text{Sn})$, $\text{ReGa}_{5.08}(\text{Pb})$ and $\text{ReGa}_{5.13}(\text{Bi})$.

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
<i>ReGa_{4.96}(Sn)</i>						
Re1	0.0099(3)	0.0099(3)	0.0044(4)	0	0	0
Ga2	0.0063(8)	0.0208(11)	0.0214(9)	0	0	-0.0006(7)
Ga3	0.0297(8)	0.0297(8)	0.076(2)	-0.0343(11)	-0.0343(11)	0.0090(10)
Ga4	0.015(8)	0.015(8)	0.033(13)	0	0	0
Ga5	0.038(7)	0.032(7)	0.013(4)	-0.002(4)	-0.002(4)	0.010(5)
<i>ReGa_{5.08}(Pb)</i>						
Re1	0.0077(2)	0.0077(2)	0.0064(2)	0	0	0
Ga2	0.0238(8)	0.0055(6)	0.0185(6)	0	0	0.0000(5)
Ga3	0.0254(5)	0.0254(5)	0.0682(12)	-0.0300(6)	-0.0300(6)	0.0085(6)
Ga4	0.0071(12)	0.0071(12)	0.053(3)	0	0	0
Ga5	0.022(4)	0.043(6)	0.008(2)	-0.002(3)	0.0041(18)	-0.004(4)
<i>ReGa_{5.13}(Bi)</i>						
Re1	0.00718(18)	0.00718(18)	0.0051(2)	0	0	0
Ga2	0.0059(5)	0.0336(8)	0.0148(6)	0	0	-0.0002(5)
Ga3	0.0223(4)	0.0223(4)	0.0531(10)	0.0220(5)	0.0220(5)	0.0057(5)
Ga4	0.0070(8)	0.0070(8)	0.021(3)	0	0	0
Ga5	0.025(7)	0.054(10)	0.003(3)	-0.004(5)	0.000(3)	-0.010(6)

Table S2. SEM/EDS determined chemical compositions and images for $\text{ReGa}_{4.96}(\text{Sn})$, $\text{ReGa}_{5.08}(\text{Pb})$ and $\text{ReGa}_{4.76}(\text{Bi})$.



Loaded Compd	ReSnGa	RePbGa	ReBiGa
Spot 1	$\text{Re}_{1.0(3)}\text{Sn}_{0.1(7)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Bi}_{0.1(4)}\text{Ga}_{5.0(2)}$
Spot 2	$\text{Re}_{0.9(4)}\text{Sn}_{0.1(2.05)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Bi}_{0.1(4)}\text{Ga}_{5.0(2)}$
Spot 3	$\text{Re}_{1.0(3)}\text{Sn}_{0.1(6)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Bi}_{0.2(4)}\text{Ga}_{5.0(2)}$



Loaded Compd	ReSnGa	RePbGa	ReBiGa
Spot 1	$\text{Re}_{1.0(2)}\text{Sn}_{0.1(4)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Bi}_{0.2(4)}\text{Ga}_{5.0(2)}$
Spot 2	$\text{Re}_{1.0(2)}\text{Sn}_{0.1(4)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.1(2)}\text{Bi}_{0.1(4)}\text{Ga}_{5.0(2)}$
Spot 3	$\text{Re}_{1.0(2)}\text{Sn}_{0.1(5)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.0(2)}\text{Pb}_{0.1(4)}\text{Ga}_{5.0(2)}$	$\text{Re}_{1.1(2)}\text{Bi}_{0.2(4)}\text{Ga}_{5.0(2)}$

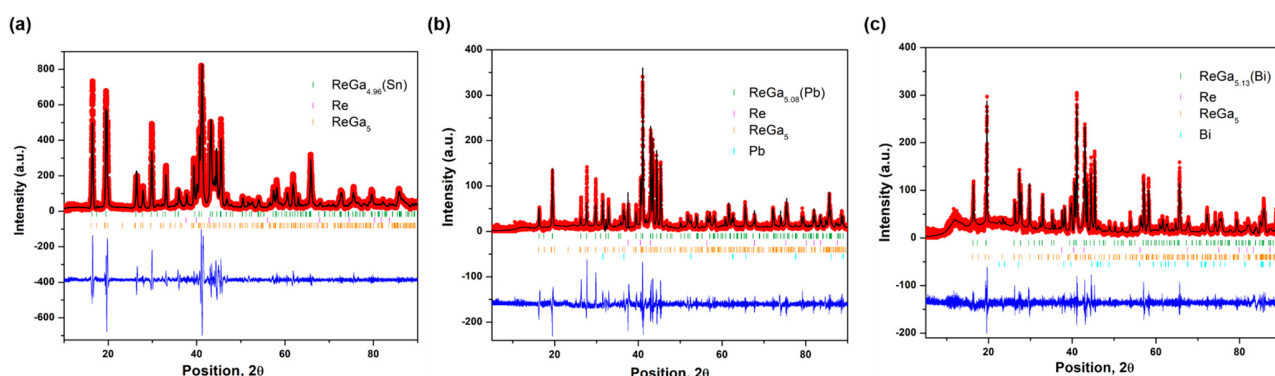


Figure 1. Powder X-ray diffraction patterns for (a) $\text{ReGa}_{4.96}(\text{Sn})$, (b) $\text{ReGa}_{5.08}(\text{Pb})$ and (c) $\text{ReGa}_{4.76}(\text{Bi})$. The observed data is represented as red circles and calculated pattern as a black line. The corresponding residual pattern (difference between observed and theoretical patterns) is shown by the blue line. The vertical tick marks indicate the theoretical Bragg peak positions for $\text{ReGa}_{4.96}(\text{Sn})$ (green), Re (magenta), ReGa_5 (orange) and Pb/Bi (blue).

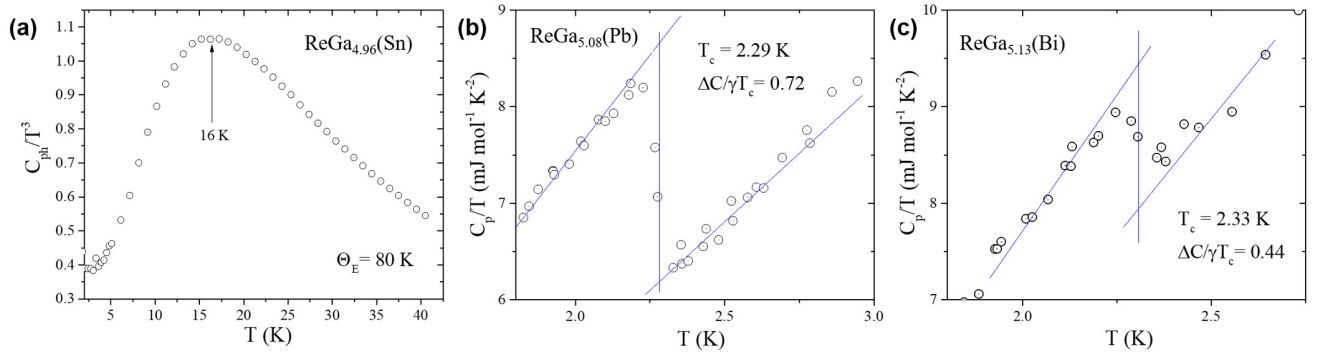


Figure S2. (a) Heat capacity ($C_{ph}/T^3 \sim T$) range 1.85 to 300 K for $\text{ReGa}_{4.96}(\text{Sn})$. (b) (c) Heat capacity ($C_p(T)/T \sim T$) range 1.85 to 300 K for $\text{ReGa}_{5.08}(\text{Pb})$ and $\text{ReGa}_{5.13}(\text{Bi})$ to obtain critical temperature (T_c) and the specific heat jump ($\Delta C/\gamma T_c$).