Supporting Information

Phase Diagram and Superconductivity: New Insight into the Fundamentals of InSn Bimetallic Alloys

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Figure S1 The observed (data points) and Rietveld refined (solid line) SRXRD patterns of In_pSn_{p-1} ($0.01 \leq p \leq 0.99$) bimetallic alloys. Green and blue colored lines represent fit to background and difference between fitted and observed diffraction pattern.

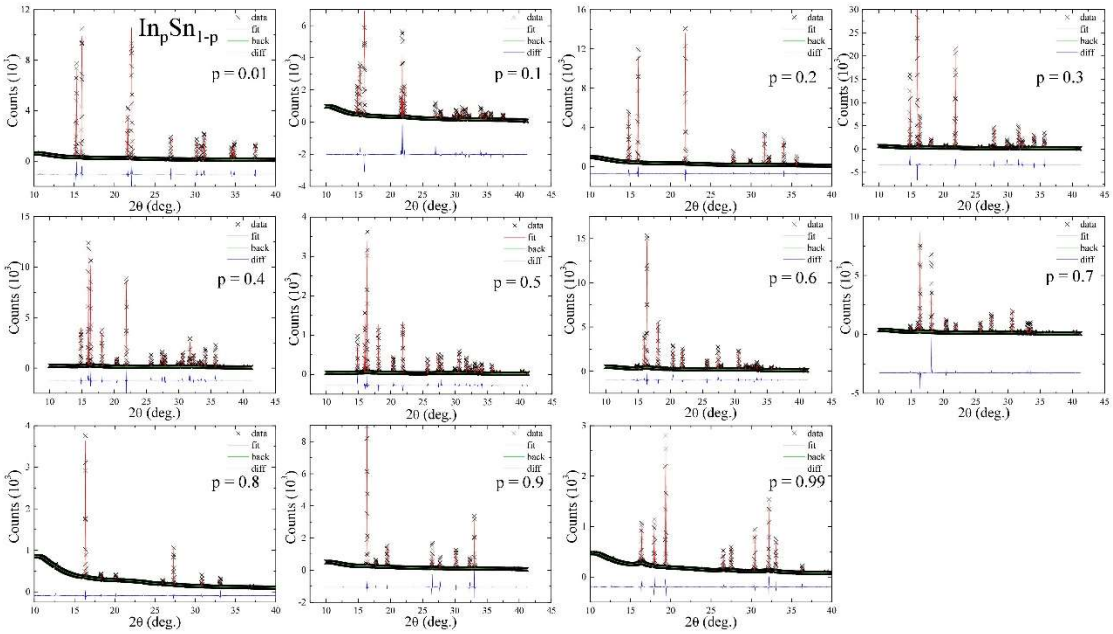

Figure S2 Composition *p* dependency of fitted values of lattice constant of α-Sn, γ-Sn, β-InSn and α-In phases (top to bottom).

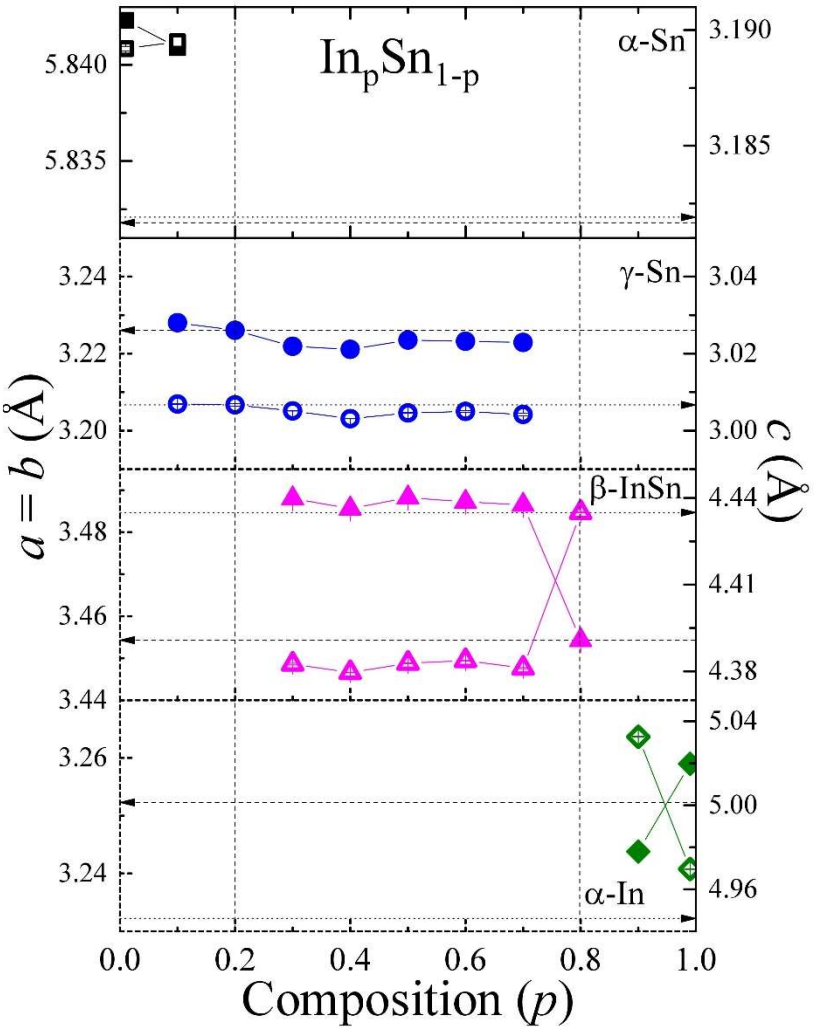

Figure S3 ZFC M(T) curves of p = 0.1, 0.3, 0.4, 0.6, 0.7 and 0.9 alloys, where solid line represent a fit using London expression.

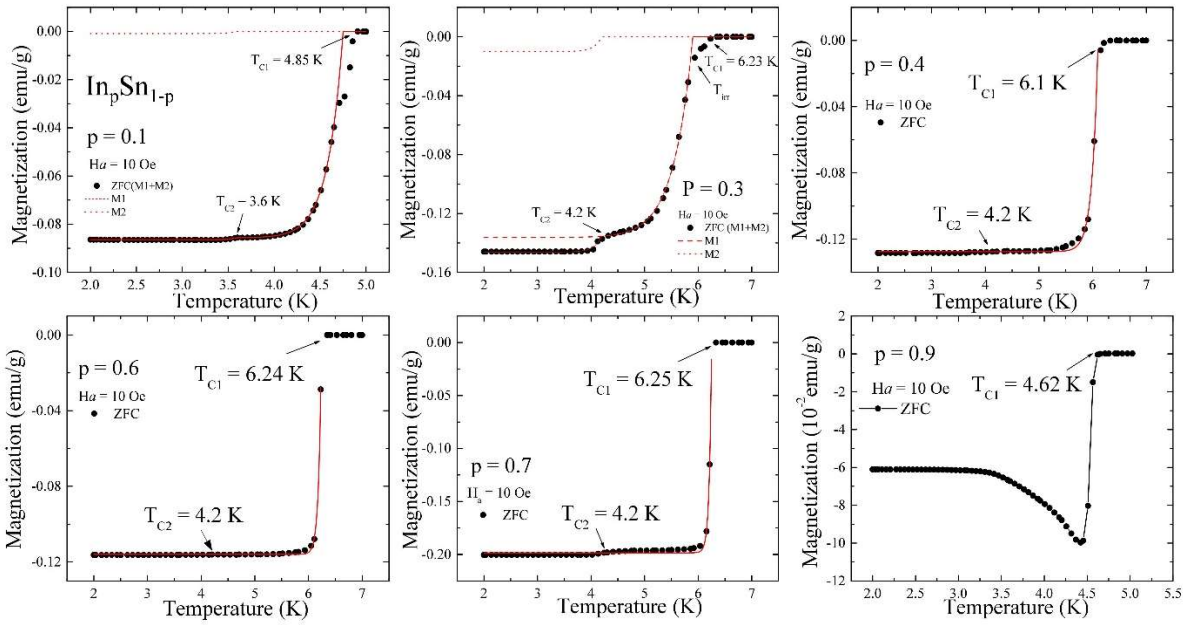

Figure S4 Calculated grain size of α-Sn, γ-Sn, β-InSn, and α-In phases.

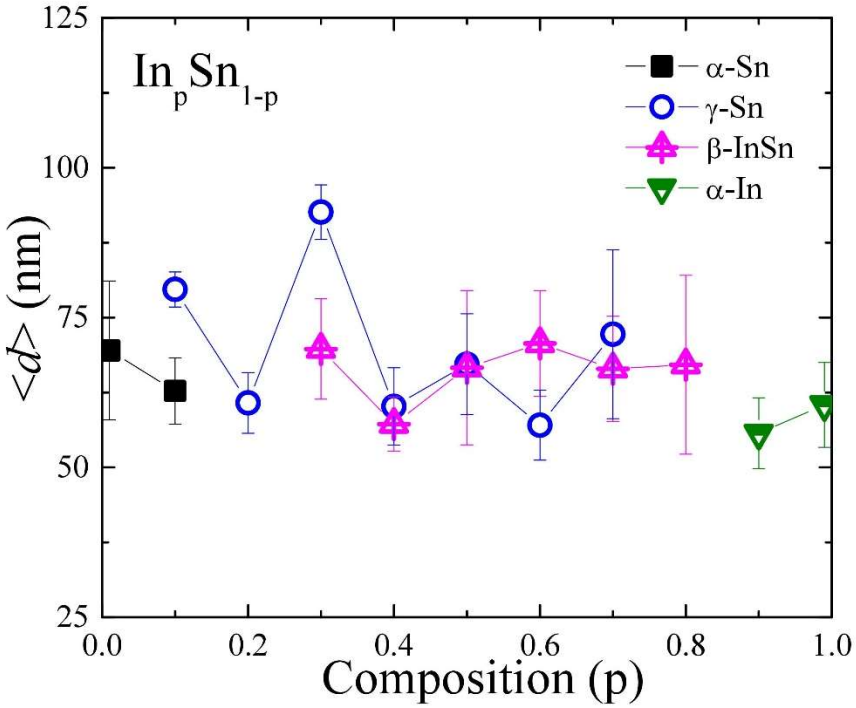

Figure S5 M(H_a) loops of p = 0.01 and 0.2 to 0.99 alloys, where solid line represent a linear fit in low-field region. Inset of p = 0.01 alloy gives the goodness of fit.

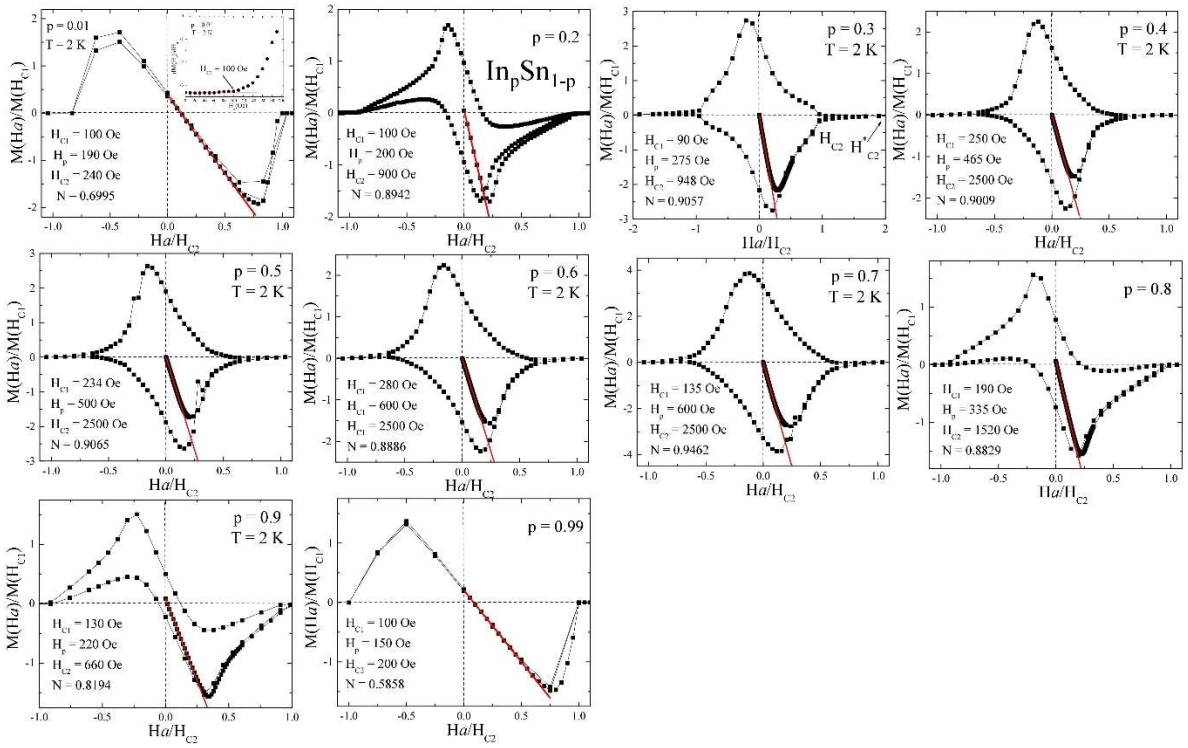

Figure S6 The first and second curve of M(H_a) loop measured at a various temperature within the superconducting state of p = 0.01, 0.2 to 0.99 alloys. The solid line in the low-field region represents a linear fit.

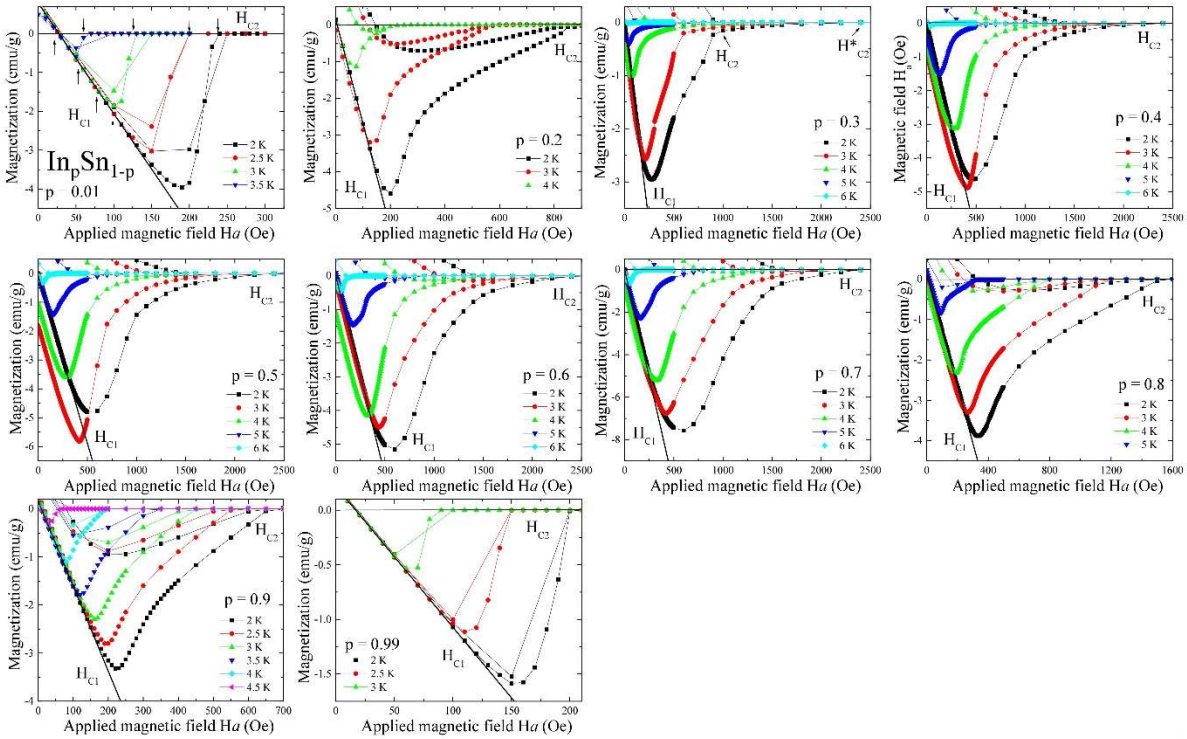

Figure S7 ZFC M(T) curve measured in various external field H_a from $p = 0.01$ to 0.99 alloys. The solid line represents fit using London expression.

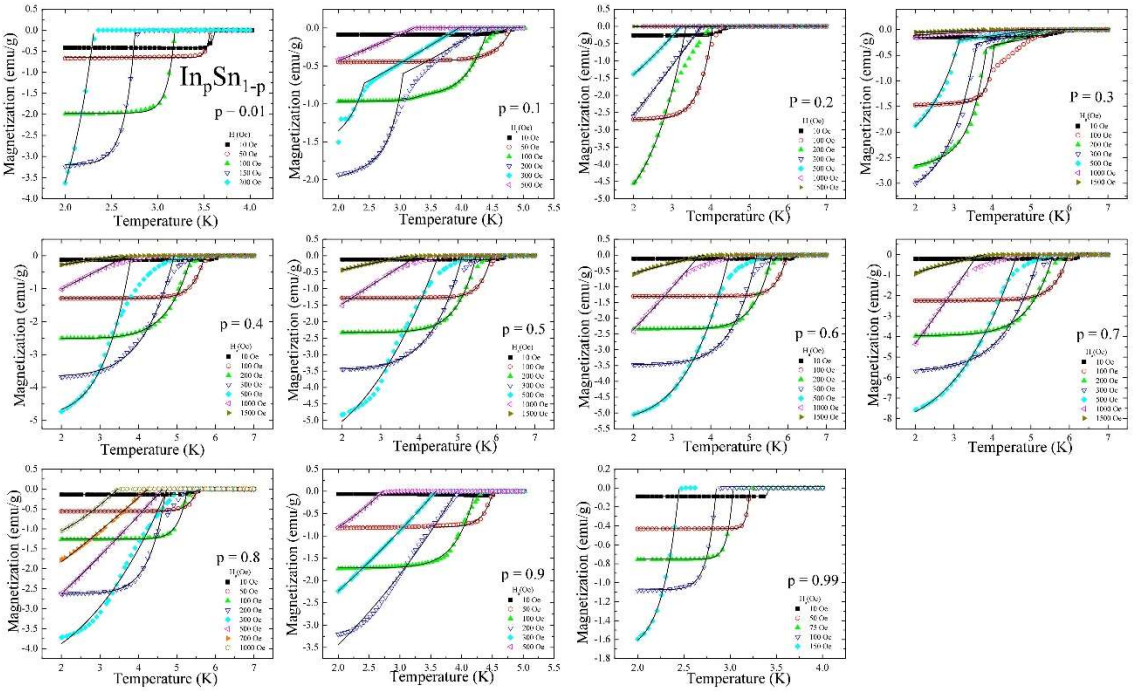

Table S1 Summary of the fitting parameters obtained from the Rietveld refinement of the SRXRD spectra ($a = b$, c, wRp, Rp, χ^2, weight fraction).

In_pSn_{1-p}	GSAS fitting parameters														
	Lattice constants (Å)								wRp	Rp	χ^2	Wt. Frac (%)			
	β-Sn Phase		γ-Sn Phase		β-InSn Phase		In-Phase								
	a=b	*c*	*a=b*	*c*	*a=b*	*c*	*a=b*	*c*				δ-Sn	γ-Sn	β-InSn	α-In
0.01	5.8423(1)	3.1892(1)							0.0798	0.0434	2.062	100			
0.1	5.8409(3)	3.1895(3)	3.2280(1)	3.0069(1)					0.1074	0.0554	4.390	61	39		
0.2			3.22604(4)	3.00670(32)					0.0467	0.0215	0.8629		100		
0.3			3.2219(1)	3.005100(1)	3.4880(1)	4.3825(3)			0.1071	0.0617	5.968		82	18	
0.4			3.2211(1)	3.003086(1)	3.4856(1)	4.3796(1)			0.1279	0.0801	4.442		48	52	
0.5			3.2235(1)	3.0046(1)	3.4882(1)	4.3828(1)			0.1066	0.0675	0.7204		26	74	
0.6			3.2232(1)	3.0050(2)	3.4872(1)	4.3837(1)			0.0865	0.0507	2.541		15	85	
0.7			3.2229(2)	3.0042(3)	3.4865(1)	4.3811(2)			0.1452	0.0805	4.680		16	84	
0.8					3.4543(1)	4.4350(1)			0.0254	0.0090	0.1778			100	
0.9							3.2438(1)	5.0326(2)	0.1291	0.0476	3.689				100
0.99							3.2590(1)	4.9696(1)	0.0460	0.0213	0.4154				100