Electronic Supplementary Material (ESI) for RSC Advances.

A comparative study of doping effects of V and Cr on SrAlSi superconductor

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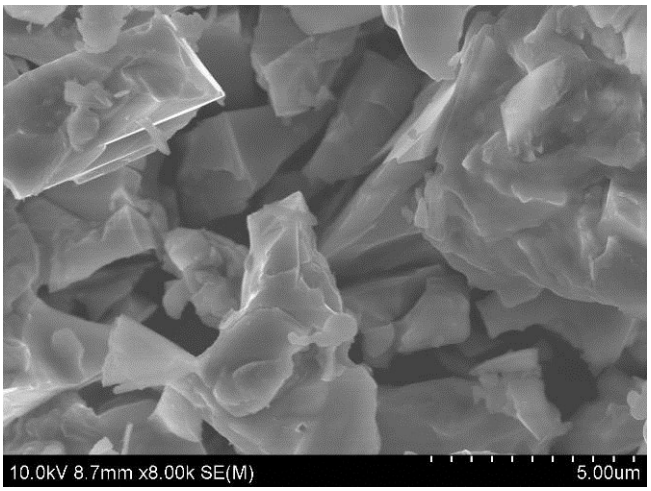
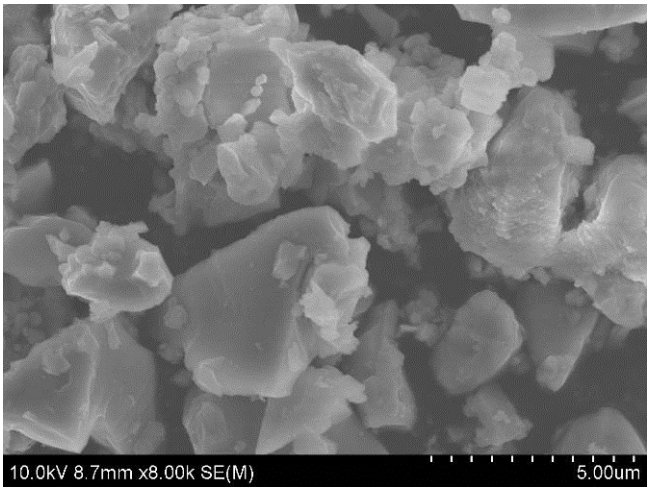
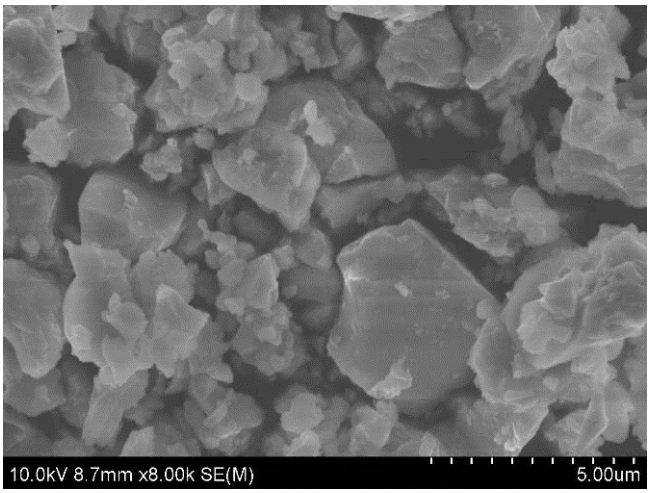


(a)



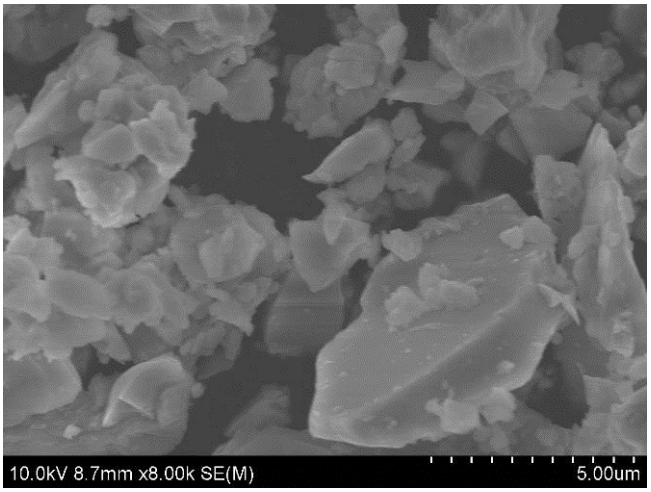
(b)



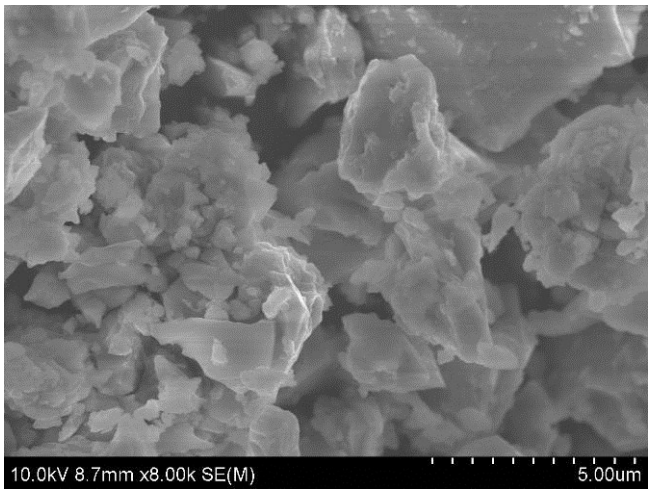
(c)

Figure S1. The SEM morphologys of (a) SrAlSi, (b) $SrAl_{0.9}V_{0.1}Si$ and (c) $SrAl_{0.8}V_{0.2}Si$ samples.

(a)



(b)



(c)

Figure S2. The SEM morphologys of (a) SrAlSi, (b) $SrAl_{0.9}Cr_{0.1}Si$ and (c) $SrAl_{0.7}Cr_{0.3}Si$ samples.

Table S1. EDX analysis of elemental compositions for a series of $SrAl_{1-x}V_xSi$ (x = 0, 0.05, 0.1, 0.15 and 0.2) and $SrAl_{1-x}Cr_xSi$ (x = 0, 0.1, 0.2 and 0.3) compounds.

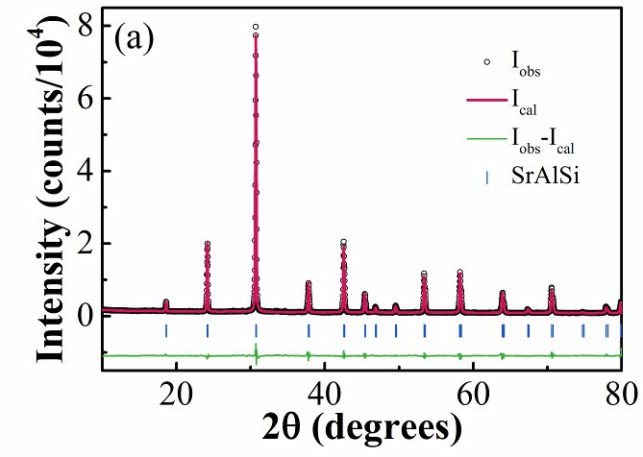
$SrAl_{1-x}V_xSi$		$SrAl_{1-x}Cr_xSi$	
Nominal V content (x)	Measured composition (Sr:Al:V:Si)	Nominal Cr content (x)	Measured composition (Sr:Al:Cr:Si)
0	1.02:0.93:0:1	0	1.02:0.93:0:1
0.05	1.12:0.84:0.05:1	0.1	1.06:0.85:0.09:1
0.10	1.05:0.88:0.11:1	0.2	1.10:0.83:0.11:1
0.15	1.02:0.83:0.14:1	0.3	1.08:0.81:0.13:1
0.20	1.04:0.79:0.16:1		

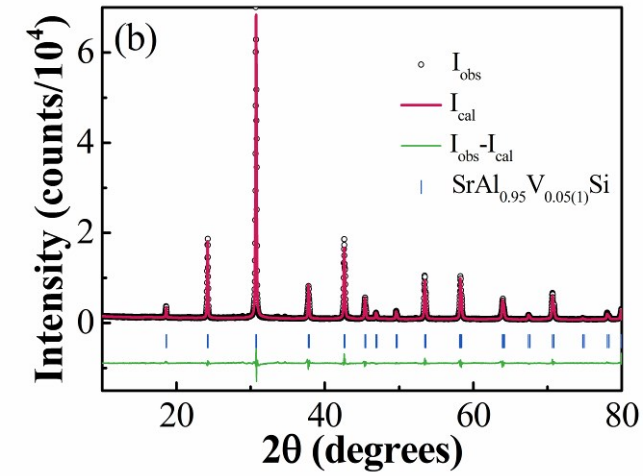
Refinements details: For X-ray diffraction, in the final run, the following parameters were refined: zero-point, half-width, peak shape, preferred orientation, asymmetry, scale factor and unit cell parameters and the positional parameter of V/Cr.

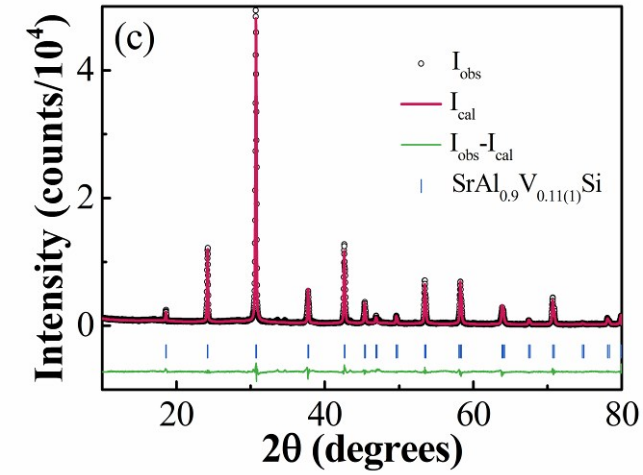
Table S2. Summary of Rietveld refinement parameters in hexagonal AlB_2 structure for $SrAl_{1-x}V_xSi$ (x =0, 0.05, 0.1, 0.15 and 0.2).

Nominal	SrAlSi	$SrAl_{0.95}V_{0.05}Si$	$SrAl_{0.9}V_{0.1}Si$	$SrAl_{0.85}V_{0.15}Si$	$SrAl_{0.8}V_{0.2}Si$
Refined	SrAlSi	$SrAl_{0.95}V_{0.05(2)}Si$	$SrAl_{0.9}V_{0.11(2)}Si$	$SrAl_{0.85}V_{0.14(1)}Si$	$SrAl_{0.8}V_{0.16(1)}Si$
Space group	P6/*mmm*				
a (Å)	4.2415 (4)	4.2349 (6)	4.2323 (3)	4.2298 (5)	4.2253 (3)
c (Å)	4.7499 (5)	4.7505 (4)	4.7507 (7)	4.7495 (5)	4.7509 (9)
R_p	4.64 %	4.74%	3.89%	5.58%	4.44%

R_{wp}	6.53 %	6.57%	5.40%	7.70%	6.15%
R_{exp}	2.35 %	2.57%	2.09%	2.55 %	2.15%







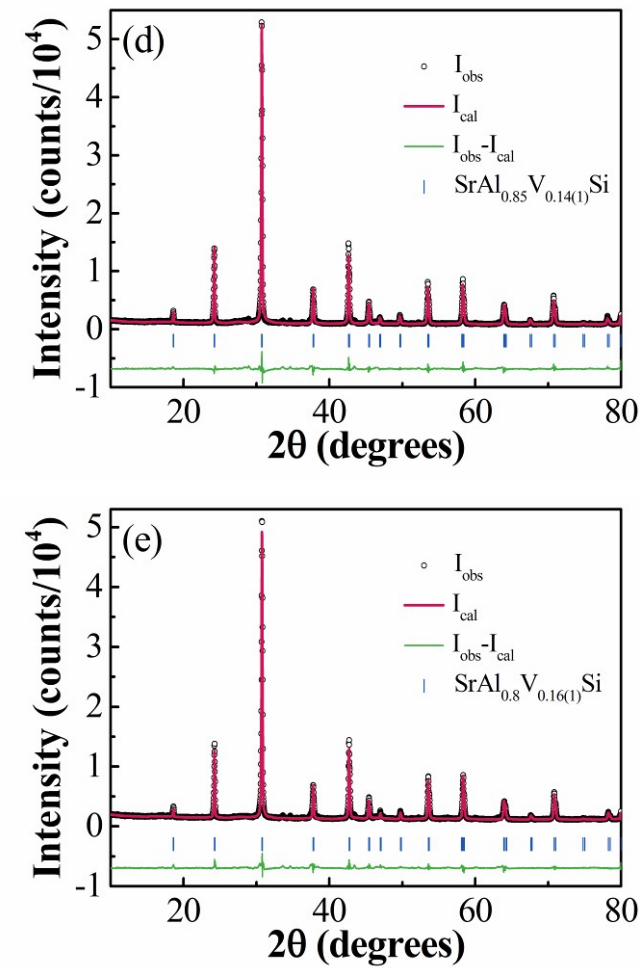
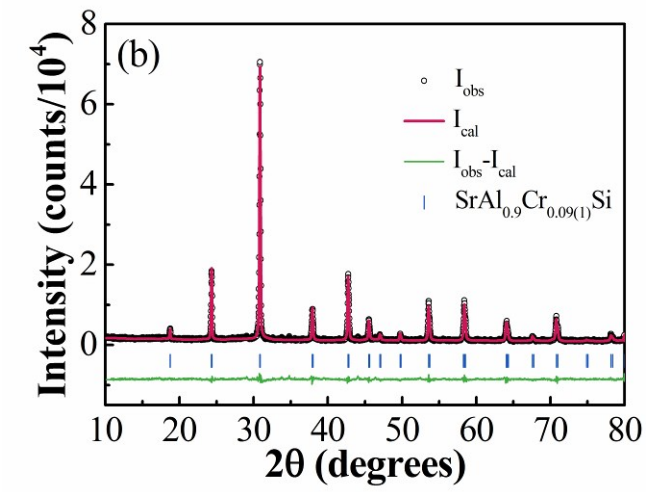
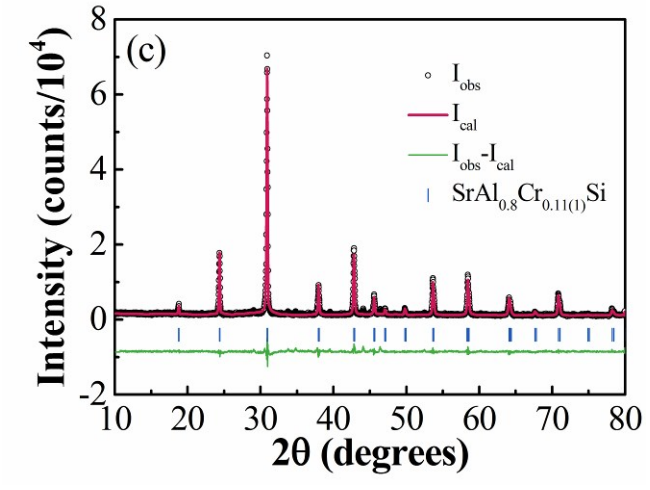


Figure S3. PXRD patterns for samples with nominal compositions of (a) SrAlSi, (b) $SrAl_{0.95}V_{0.05}Si$, (c) $SrAl_{0.9}V_{0.1}Si$, (d) $SrAl_{0.85}V_{0.15}Si$, and (e) $SrAl_{0.8}V_{0.2}Si$ collected at room temperature, Cu Kα radiation. The Rietveld refinement fits, difference profiles, and positions of Bragg peaks are also shown.

Table S3. Summary of Rietveld refinement parameters in hexagonal AlB_2 structure for $SrAl_{1-x}Cr_xSi$ (x =0, 0.1, 0.2 and 0.3).

Nominal	SrAlSi	$SrAl_{0.9}Cr_{0.1}Si$	$SrAl_{0.8}Cr_{0.2}Si$	$SrAl_{0.7}Cr_{0.3}Si$
Refined	SrAlSi	$SrAl_{0.9}Cr_{0.09(2)}Si$	$SrAl_{0.8}Cr_{0.11(1)}$	$SrAl_{0.7}Cr_{0.13(1)}Si$
Space group	P6/*mmm*			
a (Å)	4.2415 (4)	4.231 (1)	4.226 (1)	4.223 (1)
c (Å)	4.7499 (5)	4.7491 (1)	4.7497 (7)	4.7499 (2)
R_p	4.64 %	7.74%	8.24 %	5.25 %
R_{wp}	6.53 %	10.1 %	10.9 %	7.85 %
R_{exp}	2.35 %	2.32 %	2.19 %	2.40 %


(b)
I_{obs}
I_{cal}
I_{obs}-I_{cal}
$SrAl_{0.9}Cr_{0.09(1)}Si$
Intensity (counts/10^4)
2θ (degrees)


(c)
I_{obs}
I_{cal}
I_{obs}-I_{cal}
$SrAl_{0.8}Cr_{0.11(1)}Si$
Intensity (counts/10^4)
2θ (degrees)

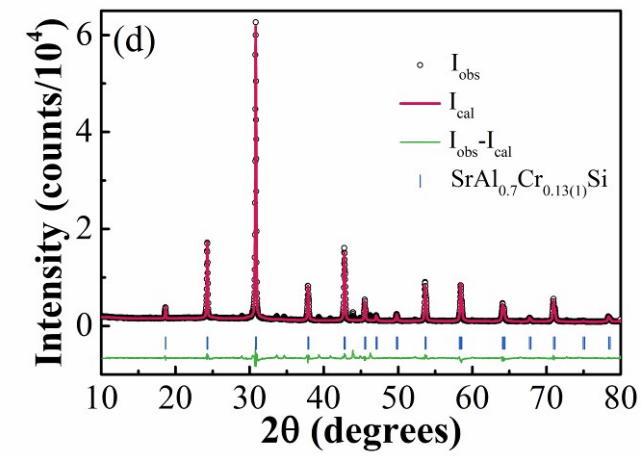


Figure S4. PXRD patterns for samples with nominal compositions of (a) SrAlSi, (b) $SrAl_{0.9}Cr_{0.1}Si$, (c) $SrAl_{0.8}Cr_{0.2}Si$, and (d) $SrAl_{0.7}Cr_{0.3}Si$ collected at room temperature, Cu Kα radiation. The Rietveld refinement fits, difference profiles, and positions of Bragg peaks are also shown.