# Simulation 1

Result 1

==========Single objective optimization============

The minimum objective function value is: -0.5895897607071601

Optimized composition:

Ni = 19.385772149701822wt%

Ti = 3.8096149456558743wt%

Al = 2.200952274036373wt%

wt% Ni3Ti = [18.70932987]

wt% Laves = [0.]

wt% FCC = [6.02038825]

Ni3Ti formation temperature (k) = [885.898]

===================================================

Result 2:

==========Single objective optimization============

The minimum objective function value is: -0.5895808971980256

Optimized composition:

Ni = 20.658557558597163wt%

Ti = 4.272141184624605wt%

Al = 1.263874700898625wt%

wt% Ni3Ti = [18.7090486]

wt% Laves = [0.]

wt% FCC = [9.90943695]

Ni3Ti formation temperature (k) = [902.74]

===================================================

Result 3:

==========Single objective optimization============

The minimum objective function value is: -0.5895820656104118

Optimized composition:

Ni = 20.9676988742534wt%

Ti = 3.989599405520404wt%

Al = 1.984069106570683wt%

wt% Ni3Ti = [18.70908568]

wt% Laves = [0.]

wt% FCC = [9.61268145]

Ni3Ti formation temperature (k) = [884.174641]

===================================================

Result 4:

==========Single objective optimization============

The minimum objective function value is: -0.5909122920369749

Optimized composition:

Ni = 18.93924226372815wt%

Ti = 4.487414965919199wt%

Al = 2.2925386555827054wt%

wt% Ni3Ti = [18.75129748]

wt% Laves = [0.]

wt% FCC = [6.01057278]

Ni3Ti formation temperature (k) = [880.89]

===================================================

Result 5:

==========Single objective optimization============

The minimum objective function value is: -0.5895801366690105

Optimized composition:

Ni = 20.72202823362303wt%

Ti = 3.757007357426855wt%

Al = 1.158979573458188wt%

wt% Ni3Ti = [18.70902447]

wt% Laves = [0.]

wt% FCC = [9.81022965]

Ni3Ti formation temperature (k) = [900.63]

===================================================

# Simulation 2

Result 1

==========Single objective optimization============

The minimum objective function value is: -0.5910538490644277

Optimized composition:

Ni = 20.744302951434502wt%

Ti = 4.34041418900288wt%

Al = 0.5730726951938809wt%

wt% Ni3Ti = [18.75578948]

wt% Laves = [0.]

wt% FCC = [9.82748291]

Ni3Ti formation temperature (k) = [903.33]

===================================================

Result 2

==========Single objective optimization============

The minimum objective function value is: -0.5895807596924967

Optimized composition:

Ni = 20.730874023401068wt%

Ti = 4.390994481852333wt%

Al = 2.12850102929883wt%

wt% Ni3Ti = [18.70904424]

wt% Laves = [0.]

wt% FCC = [9.4684444]

Ni3Ti formation temperature (k) = [883.96]

===================================================

Result 3

==========Single objective optimization============

The minimum objective function value is: -0.5895809478914481

Optimized composition:

Ni = 20.504072072915328wt%

Ti = 4.350850276607003wt%

Al = 0.8425232971871168wt%

wt% Ni3Ti = [18.70905021]

wt% Laves = [0.]

wt% FCC = [9.83902828]

Ni3Ti formation temperature (k) = [903.43]

===================================================

Result 4

==========Single objective optimization============

The minimum objective function value is: -0.5910089302483533

Optimized composition:

Ni = 19.272534631858907wt%

Ti = 4.313963718910083wt%

Al = 1.6599818711128047wt%

wt% Ni3Ti = [18.75436408]

wt% Laves = [0.]

wt% FCC = [6.44055182]

Ni3Ti formation temperature (k) = [885.206]

===================================================

Result 5

==========Single objective optimization============

The minimum objective function value is: -0.5895879093102754

Optimized composition:

Ni = 19.233640006887796wt%

Ti = 4.475594827997169wt%

Al = 2.4725405714304363wt%

wt% Ni3Ti = [18.70927112]

wt% Laves = [0.]

wt% FCC = [5.99238871]

Ni3Ti formation temperature (k) = [881.966]

===================================================

# Simulation 3

Result 1

==========Single objective optimization============

The minimum objective function value is: -0.8151889155270022

Optimized composition:

Ni = 20.97174203468148wt%

Ti = 6.199558092327347wt%

Al = 2.9465357258553833wt%

wt% Ni3Ti = [26.60572152]

wt% Laves = [1.02782766]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [862.49]

===================================================

Result 2:

==========Single objective optimization============

The minimum objective function value is: -0.814427223414501

Optimized composition:

Ni = 20.843772478052156wt%

Ti = 6.222690526725515wt%

Al = 1.7408255347380486wt%

wt% Ni3Ti = [26.59502353]

wt% Laves = [1.04660397]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.83]

===================================================

Result 3

==========Single objective optimization============

The minimum objective function value is: -0.8139075372529581

Optimized composition:

Ni = 20.652715793691733wt%

Ti = 6.346177405866486wt%

Al = 1.4359009394874311wt%

wt% Ni3Ti = [26.59103597]

wt% Laves = [1.0640297]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [906.32782479]

===================================================

Result 4

==========Single objective optimization============

The minimum objective function value is: -0.8147924238543575

Optimized composition:

Ni = 20.953924190352808wt%

Ti = 6.189652040782809wt%

Al = 2.7512236155096055wt%

wt% Ni3Ti = [26.59853354]

wt% Laves = [1.03534482]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [861.45]

Result 5

==========Single objective optimization============

The minimum objective function value is: -0.8147221602898727

Optimized composition:

Ni = 20.764453094829083wt%

Ti = 5.771251310948233wt%

Al = 2.7512961579740964wt%

wt% Ni3Ti = [26.60535788]

wt% Laves = [1.04796306]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [860.28]

===================================================

Result 6

==========Single objective optimization============

The minimum objective function value is: -0.814293747217932

Optimized composition:

Ni = 20.540305723049045wt%

Ti = 6.35456460346852wt%

Al = 2.6047278381592696wt%

wt% Ni3Ti = [26.5984325]

wt% Laves = [1.05725791]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [862.47]

===================================================

Result 7

==========Single objective optimization============

The minimum objective function value is: -0.8149728905846695

Optimized composition:

Ni = 20.740038401551676wt%

Ti = 5.980926896518439wt%

Al = 1.1086212650186489wt%

wt% Ni3Ti = [26.60502698]

wt% Laves = [1.03641338]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [905.82]

===================================================

Result 8

==========Single objective optimization============

The minimum objective function value is: -0.814007290980438

Optimized composition:

Ni = 20.672157901725047wt%

Ti = 5.622331802960689wt%

Al = 2.1113303877662757wt%

wt% Ni3Ti = [26.60976151]

wt% Laves = [1.08571521]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.82]

===================================================

Result 9

==========Single objective optimization============

The minimum objective function value is: -0.8152057248368244

Optimized composition:

Ni = 20.86050844400898wt%

Ti = 5.6648134279799285wt%

Al = 2.748684256073531wt%

wt% Ni3Ti = [26.60585398]

wt% Laves = [1.02726888]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [861.83]

===================================================

Result 10

==========Single objective optimization============

The minimum objective function value is: -0.8143015779471083

Optimized composition:

Ni = 20.653480417732762wt%

Ti = 5.817368559491143wt%

Al = 1.8394469711079424wt%

wt% Ni3Ti = [26.59049565]

wt% Laves = [1.04585029]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.78]

===================================================

# Simulation 4

Result 1

==========Single objective optimization============

The minimum objective function value is: -0.8790601796244476

Optimized composition:

Ni = 21.78683554767161wt%

Ti = 5.883231281209309wt%

Al = 2.7659489176527803wt%

wt% Ni3Ti = [27.94775266]

wt% Laves = [0.07347102]

wt% FCC = [0.00934759]

Ni3Ti formation temperature (k) = [862.70258094]

===================================================

Result 2

==========Single objective optimization============

The minimum objective function value is: -0.8790331633272316

Optimized composition:

Ni = 21.53603021401843wt%

Ti = 5.935678138447079wt%

Al = 2.935574436516628wt%

wt% Ni3Ti = [27.94700031]

wt% Laves = [0.0736173]

wt% FCC = [0.02137827]

Ni3Ti formation temperature (k) = [863.17572046]

===================================================

Result 3

==========Single objective optimization============

The minimum objective function value is: -0.8791104661112625

Optimized composition:

Ni = 21.953231176813823wt%

Ti = 5.916835781884522wt%

Al = 3.0017310164693245wt%

wt% Ni3Ti = [27.95009672]

wt% Laves = [0.07451394]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [863.5]

===================================================

Result 4

==========Single objective optimization============

The minimum objective function value is: -0.8786688019137472

Optimized composition:

Ni = 21.71709255962869wt%

Ti = 6.140761907997352wt%

Al = 3.102781920128465wt%

wt% Ni3Ti = [27.93666122]

wt% Laves = [0.07532191]

wt% FCC = [0.01203068]

Ni3Ti formation temperature (k) = [863.3]

===================================================

Result 5

==========Single objective optimization============

The minimum objective function value is: -0.8789707570472184

Optimized composition:

Ni = 21.635120675566483wt%

Ti = 6.0357837876674445wt%

Al = 2.8691701684456894wt%

wt% Ni3Ti = [27.93825175]

wt% Laves = [0.06418465]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [863.69]

===================================================

# Simulation 4

Result 1

==========Single objective optimization============

The minimum objective function value is: -0.814547399173872

Optimized composition:

Ni = 20.851624177322503wt%

Ti = 6.432778919556143wt%

Al = 2.735339408183109wt%

wt% Ni3Ti = [26.59929613]

wt% Laves = [1.04724379]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [861.73]

===================================================

Result 2

==========Single objective optimization============

The minimum objective function value is: -0.8141936727284727

Optimized composition:

Ni = 20.75346495311101wt%

Ti = 6.219256672842949wt%

Al = 1.5564163357754337wt%

wt% Ni3Ti = [26.5942915]

wt% Laves = [1.05591252]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.22614199]

===================================================

Result 3

==========Single objective optimization============

The minimum objective function value is: -0.8144899781235382

Optimized composition:

Ni = 20.705926736650536wt%

Ti = 5.857409350257787wt%

Al = 1.7688649087763244wt%

wt% Ni3Ti = [26.60333193]

wt% Laves = [1.05540778]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.95]

===================================================

Result 4

==========Single objective optimization============

The minimum objective function value is: -0.8150659266679541

Optimized composition:

Ni = 20.88287123966265wt%

Ti = 6.320993946617023wt%

Al = 2.4752428062047693wt%

wt% Ni3Ti = [26.61112598]

wt% Laves = [1.04079883]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [881.89]

===================================================

Result 5

==========Single objective optimization============

The minimum objective function value is: -0.8139709096917769

Optimized composition:

Ni = 20.890590371204933wt%

Ti = 5.867808129481448wt%

Al = 2.5223674599783554wt%

wt% Ni3Ti = [26.58082271]

wt% Laves = [1.04699321]

wt% FCC = [0.]

Ni3Ti formation temperature (k) = [861.06]

===================================================