Algorithms for Two Dimensional Geometry Optimisation

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Contents

Abstract

This report was developed for the purpose of identifying and testing the efficiency of alternate and underexplored methods for solving the two dimensional molecular model optimisation problem. The main approach investigated in this report is a modified annealing search algorithm, which optimises each angle one at a time randomly and the results are compared to those of standard annealing algorithms, which randomly modify each angle at each step in an attempt to find a global minimum. This investigation also applies the Limited-Memory Broyden Fletcher Goldfarb Shanno algorithm, or LBFGS in order to investigate the impact of the optimiser on systems which are already approaching a global minimum. These algorithms are benchmarked by a procedural search algorithm which optimises each angle one by one like the first algorithm however instead of searching for the correct angle randomly, it checks every angle from $-180...180$ using an angle step size it is given. This algorithm is very fast, and given a useful iteration size it is always able to find the global minimum after the use of BFGS however, it does not count as a randomised global search algorithm and was developed for benchmarking outside of the known best costs and serves to provide an estimate for the level of error present in the other estimations. The algorithms were tested on starting solution states in linear, circular and square patterns in order to examine how they are able to adjust to different initial solution states. Completely random starting states were not fully investigated as finding a reasonable optimum with bond crossovers is unreasonably difficult, and it is not time-economical to randomly generate a solution state without crossovers for any solution where $n > 20$. For all board states of $n < 3$, the atom by atom optimisation had significantly better results than the standard annealing algorithm when both are given the exact same cooling function, starting state and number of iterations.

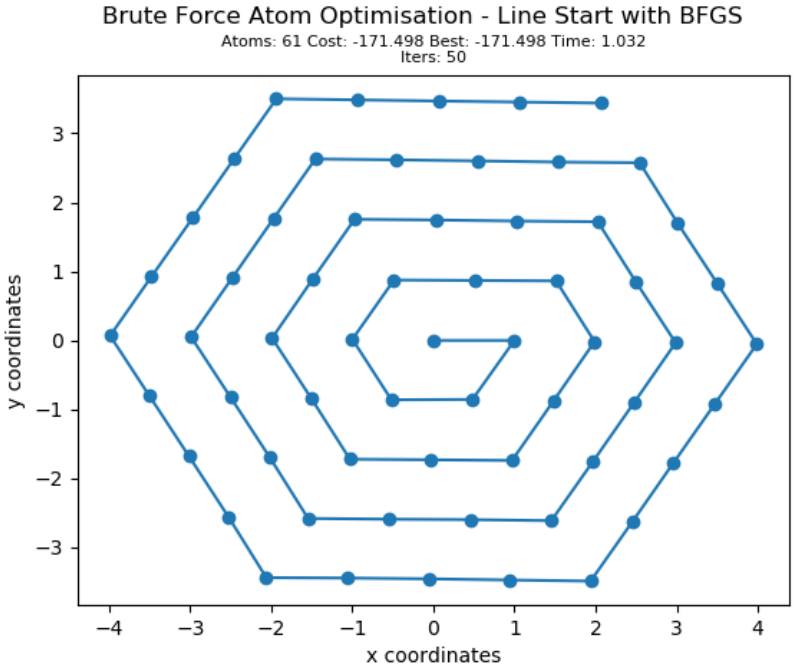

Figure 1: Globally optimal configuration for the 61st case, found using the procedural (brute force) algorithm with a linear starting state, post-operation BFGS applied an angle step size of 50.

0.1 Introduction

Two dimensional model optimisation is the process of minimising the potential energy of a molecule with a given number of atoms, each constrained linearly using unit length bonds. In the field of computational chemistry, this process is also referred to as geometry optimisation. The potential energy of such a system, 'V' is given by the scaled pairwise addition of Lennard-Jones potentials. The purpose of this investigation is to develop an algorithm for optimising the geometry of a two dimensional linear bonded molecule of a given size 'N' and investigate new, efficient approaches for solving this problem that take advantage of the features of this problem which separate it from other global optimisation problems. While this problem operates on an extremely simple representation of an atom in a two dimensional space, the investigation is useful for developing molecular structure optimisation algorithms as most algorithms for solving the two dimensional problem can be translated to higher dimensions without undue complexity.

While there are a number of theoretical energy functions which can be used to find the energy of a molecule, the most popular is the scaled Lennard-Jones

potentials function, which can be expressed as

$V = \sum_{i<j}^{N} (1.0/r_{ij}^{12} - 2.0/r_{ij}^{6})$

Where
$r_{ij} = \sqrt{r_{ij}^2} = \sqrt{x_{ij}^2 + y_{ij}^2}$

And x_{ij}, y_{ij} are the result of the difference between the x and y coordinates of molecule atoms i, j. Lennard-Jones potentials are used for this problem as it provides an intuitive and efficient method for finding the energy in a two dimensional space, and can be translated to a three dimensional model with relative simpliciy.

Due to the unit lengh bond constraints placed on the model, it is extremely difficult to constrain the model when each atom is stored with respect to its (x, y) coordinate components. As a result of this, for this investigation the first two atoms in each molecule will be held in fixed positions at $0, 0$ and $1, 0$ respectively, and the angle of each atom to its next neighbour in the chain will be stored in order to calculate the coordinates for each atom based upon the distance and angle from the previous atom in the sequence. For the remainder of this report, the relative angles between each atom will be referred to as α.

0.2 Literature Review

A molecule can be defined as "the simplest unit of a chemical substance, usually a group of two or more atoms.""(Dictionary,2018). An atom is defined as "the smallest unit of any chemical element, consisting of a positive nucleus surrounded by negative electrons." (Dictionary, 2018). Understanding the stable configurations of a molecule is important because it enables us to understand its properties and behaviour with respect to its structure. When a molecule is constructed using computational chemistry software it may not be given a stable initial state. This means that if the same molecule were to be constructed in reaslity, it may be unstable and behave unexpectedly. In order to prevent this, geometry optimisation is performed to find a stable state for the molecule.

A number of studies have been performed on solving this problem using randomised global search algorithms such as genetic algorithms or simulated annealing. In some investigations, these higher-level global search algorithms are accompanied by a local optimisation algorithm, such as the Limited Memory Broyden Fletcher Goldfarb Shanno algorithm, or L-BFGS. An example of such a study was published in 1996 by Dr Wayne Pullan, who developed an in-depth report of numerous algorithms applied to geometry optimisation for both two and three dimensional problems. Since then, a number of closed studies have been performed on similar areas of investigation which have used that paper as a citation. The paper primarily discusses the application of genetic algorithms

to the problem, when supported by the L-BFGS algorithm and also discusses the effectiveness of other stochastic gradient descent methods such as simulated annealing.

Crossovers are a particularly significant issue which can arise during the run-time of a solving algorithm, and involves the crossing over of two different line segments in a bond constrained model. Crossovers are usually easy to detect, and are typically indicated by a massive positive spike in the energy of a molecular model. However, while they may be easy to detect it is extremely difficult to escape them in an intuitive way. It is particularly difficult to avoid in population based search implementations, as they rely on having a large pool of solution states which are combined at every iteration and presere the environments closest to the desired solution at each iteration. Due to the nature of these algorithms involving random combinations of atom positions, it is extremely likely for these combinations to introduce crossovers. Crossovers can be fixed by recursively straightening out the angle to the next atom in the chain associated with the offending atoms until no more crossovers occur, however this is expensive and it is possible to involve almost completely resetting a solution state to its starting positions. In general, it is better to avoid causing crossovers in the first place.

Based upon previous research, for this investigation it was decided that an interesting and underexplored approach for solving this problem was to optimise each angle individually, one at a time in order rather than trying to optimise the entire population at each step. There are several different approaches using this method which were investigated, and these will be elaborated upon in the following sections of the report.

0.3 Algorithm Description

0.3.1 Section Introduction

The following section will describe the algorithms which were implemented for testing different approaches for solving this problem. The algorithms implemented are relatively similar in function and implementation, and serve the purpose of comparing the efficiency of solving the same problem using fundamentally similar methods but approach the order of operations differently.

Data Structures

Matrix The following data structure is a simplified matrix class which was developed to store the $r(i, j)$ components for each molecule object so they could be referred to when calculating the Molecule system energy rather than recalculating each time the same $r(i, j)$ is required.

Matrix (template <class T>)
x: int y: int data: T *
Matrix(x: int, y: int): ˜Matrix(): set(i: int, j: int, v: T): void get(i: int, j: int): T

Point The following data structure is a simple point data structure developed for storing the calculated coordinates for each atom in a Molecule object.

Point
x : double y : double
=(a : Point) : Point +(a : Point) : Point -(a : Point) : Point ==(a : Point) : bool absolute() : Point

Molecule A Molecule class object was implemented for encapsulating all of the data structures necessary for defining a molecule with respect to geometry optimisation. a class diagram of the molecule object is outlined below.

Molecule
distance : Matrix<double> alphas : Eigen::VectorXd real : Eigen::VectorXd coords: std::vector<Point> n: int
getRealAngleList(void) :void getCoords(distance : double, angle : double) : Point getSystemCoordinates(void) : void getR(x : double, y : double) : double getEulerianDistanceMatrix(void) : void getSystemEnergy(void) : double Molecule(n : int): updateSystem(void) : double operator()(x : const VectorXd& , grad : Vec- torXd&) : double

Molecule Function Descriptions A number of functions utilised within the Molecule class object are fundamental to the operation of the overarching algorithms, and their function will be demonstrated in this section.

The following function is used to convert the local alpha variables for each atom to a global angle, which is required for finding the coordinates of the atom.

getRealAngleList(void): void
$real[0] \leftarrow alphas[0]$
for $i = 1$ to n **do**
  $real[i] \leftarrow real[i-1] + alphas[i]$
  if $real[i] >= (DEG2RAD * 360)$ **then**
    $real[i] -= (DEG2RAD * 360)$
  end if
end for

The following function is used to calculate the coordinate values for an atom given a distance and angle double value.

Molecule::getCoords(dist: double, angle: double): Point
return $Point(dist * cos(angle), dist * sin(angle))$

The following function is required to calculate the $r(i, j)$ component for the Lennard-Jones potentials cost function.

Molecule::getR(x: double, y: double): double
return $sqrt(x * x + y * y)$

The following function is used to store the atomic distances for each atom in the lookup table 'distances', to prevent repeat calculations occuring during the Lennard-Jones potentials calculation and the BFGS derivative calculation.

Molecule::getEulerianDistanceMatrix(void): void
for $i = 0$ to n **do**
  for $j = 0$ to n **do**
    if $i == j$ **then**
      $distance \leftarrow set(i, j, 0.0)$
    else
      $temp = Point(coords[i] - coords[j]) \leftarrow absolute()$
      $distance \leftarrow set(i, j, getR(temp.x, temp.y))$
    end if
  end for
end for

The following function calculates the Lennard-Jones potentials for each atom pair, and sums them to form the overall cost of the molecular system. This function forms the basis of cost for the heuristic search functions.

Molecule::getSystemEnergy(void): double
$V \leftarrow 0.0$
for $i = 0$ to n **do**
  for $j = 0$ to j **do**
    $a \leftarrow (1.0/pow(distance(i, j), 12.0))$
    $b \leftarrow (2.0/pow(distance(i, j), 6.0))$
    $V \leftarrow V + (a - b)$
  end for
end for
return V

The following function simply calls all of the update functions in the correct order of operations, and then returns the current system energy. This function is called any time the system alphas are modified, and a new cost evaluation is required.

Molecule::updateSystem(void): double
$getRealAngleList()$
$getSystemCoordinates()$
$getEulerianDistanceMatrix()$
return $getSystemEnergy()$

The following is used by the BFGS algorithm to find the derivative of the Lennard-Jones cost function at a given point during the simulation. Mathematical proof of this algorithm and the Lennard-Jones potentials can be found in appendix 1.

Molecule::operator()(x: const VectorXd&, grad: VectorXd&): double
$alphas \leftarrow x$
$cost \leftarrow updateSystem()$
for $m = 0$ to n **do**
  $grad[m] = 0.0f$
  for $i = 0$ to $m - 1$ **do**
    for $j = m + 1$ to n **do**
      $a \leftarrow pow(distance(i, j), 14.0)$
      $b \leftarrow pow(distance(i, j), 8.0)$
      $c1 \leftarrow (coords[i].x - coords[j].x)$
      $c2 \leftarrow (coords[m].y - coords[i].y)$
      $d1 \leftarrow (coords[i].y - coords[j].y)$
      $d2 \leftarrow (coords[j].x - coords[m].x)$
      $c \leftarrow c1 * c2$
      $d \leftarrow d1 * d2$
      $grad[m] \leftarrow grad[m] + (a - b) * (c + d)$
    end for
  end for
  $grad[m] \leftarrow grad[m] * -12.0$

end for
return *cost*

0.3.2 Ordered Single Pass α Optimisation

Discussion

This algorithm follows the application of an extremely strict annealing routine, which randomly optimises α_m in order α_0 ... α_{n-1}. This search is performed by iteratively assigning each α a value in the range of -180°...180° until a maximum number of iterations have been performed. Once the maximum is reached the algorithm performs the same steps on the next α variable. The pseudocode for this algorithm can be seen below.

Pseudocode

BeginOrientatedAnnealing(n: int, iters: int, tempFunc: temp, Molecule mol): double
for $i = 1$ to n **do**
  $T = temp(n/i)$
  for $j = 0$ to $iters$ **do**
    $pE = mol.updateSystem()$
    $tv = mol.alphas[i]$
    $mol.alphas[i] = random(-180, 180)$
    $E = mol.updateSystem()$
    if $E > pE$ **then**
      $delta = (E - pE)$
      if $E < 0.0 and (random(0, 1) < \exp(-delta/T))$ **then**
        // accept new state
      else
        $mol.alphas[i] = tv$
      end if
    end if
  end for
end for
return $mol.updateSystem()$

0.3.3 Standard Annealing α Optimisation

Discussion

This is a standard annealing algorithm, following the same strict cooling schedule as the ordered single pass algorithm for maintaining testing consistency. It is functionally almost identical to the ordered single pass algorithm, however it works by altering every α once at each step rather than optimising each α

'iterations' times and moving on to the next atom permanently.

Pseudocode

IterativeAnnealing(n: int, iters: int, tempFunc: temp, Molecule mol): double
for $i = 1$ to $iters$ **do**
  $T = temp(n/i)$
  for $j = 0$ to n **do**
    $pE = mol.updateSystem()$
    $tv = mol.alphas[j]$
    $mol.alphas[j] = random(-180, 180)$
    $E = mol.updateSystem()$
    if $E > pE$ **then**
      $delta = (E - pE)$
      if $E < 0.0 and (random(0, 1) < \exp(-delta/T))$ **then**
        // accept new state
      else
        $mol.alphas[j] = tv$
      end if
    end if
  end for
end for
return $mol.updateSystem()$

0.3.4 Procedural α Optimisation

Discussion

This algorithm optimises each angle one by one like the first algorithm however instead of searching for the correct angle randomly, it checks every angle from -180°...180° using an angle step size it is given. This algorithm is extremely fast, and given a useful iteration size it will always find the global minimum solution after the use of BFGS when applied to a straight line solution. While this algorithm is very powerful, it does not count as a randomised global search algorithm and was developed for benchmarking outside of the known best costs and serves to provide an estimate for the level of error present in the other estimations.

Pseudocode

bruteForceMolecule(n: int, iters: int, Molecule mol): double
$bestTemp = mol.updateSystem()$
for $i = 0$ to n **do**
  $bestAngle = mol.alphas[i]$
  for $j = -180$ to 180, $j += 360/iters$ **do**

```
      mol.alphas[i] = j
      curTemp = mol.updateSystem()
      if curTemp < bestTemp then
        bestAngle = j
        bestTemp = curTemp
      else
        mol.alphas[i] = bestAngle
      end if
    end for
  end for
  return mol.updateSystem()
```

0.4 Results

0.4.1 Test Data

All of the recorded experimental data can be viewed in the appendixes section 3. This section of the report will discuss these results, and what implications they have about the usefulness of the algorithms investigated. The main focus of this discussion will be on the $n = 61$ case, however results were computed across the entire range of 2...150 for each algorithm.

0.4.2 Test Results

The format for this table are as follows:

1. Atom by Atom Optimisation - Line Start
2. Atom by Atom Optimisation - Circle Start
3. Atom by Atom Optimisation - Square Start
4. Iterative Atom Optimisation - Line Start
5. Iterative Atom Optimisation - Circle Start
6. Iterative Atom Optimisation - Square Start
7. Brute Force Atom Optimisation - Line Start
8. Brute Force Atom Optimisation - Circle Start
9. Brute Force Atom Optimisation - Square Start
10. Atom by Atom Line Start - BFGS
11. Atom by Atom Circle Start - BFGS
12. Atom by Atom Square Start - BFGS
13. Iterative Atom Line Start - BFGS
14. Iterative Atom Circle Start - BFGS
15. Iterative Atom Square Start - BFGS
16. Brute Force Atom Line Start - BFGS
17. Brute Force Atom Circle Start - BFGS
18. Brute Force Atom Square Start - BFGS

Atoms	Optimal	Found	Error	Generation	Time(s)
61	-171.50	-155.44	9.36	50	3.72
61	-171.50	-149.14	13.04	50	3.69
61	-171.50	-139.09	18.90	50	3.73
61	-171.50	-106.52	37.89	50	3.73
61	-171.50	-92.84	45.87	50	3.75
61	-171.50	-91.94	46.39	50	3.95
61	-171.50	-169.33	1.26	50	2.02
61	-171.50	-152.97	10.81	50	2.09
61	-171.50	-144.09	15.98	50	2.03
61	-171.50	-164.95	3.82	50	0.97
61	-171.50	-160.83	6.22	50	1.47
61	-171.50	-147.83	13.80	50	3.17
61	-171.50	-117.94	31.23	50	1.41
61	-171.50	-94.54	44.87	50	6.38
61	-171.50	-99.28	42.11	50	1.72
61	-171.50	-171.50	0.00	50	1.01
61	-171.50	-159.37	7.07	50	1.58
61	-171.50	-150.51	12.24	50	4.00

In this investigation it was observed that for the $n = 61$ straight line solution case, before BFGS the atom by atom optimiser had a relative error off the best known solution of 9.36%. This is compared to the standard annealing algorithm approach for the same problem, which has a relative error of 37.89%. After fifty iterations of BFGS are applied, atom by atom optimisation achieves a relative error of 3.82%. For the procedural algorithm with a step size of 50, the initial attempt has a relative error of 1.26% and after BFGS is applied it reaches the global minimum and served as the benchmark for the relative error for the other test cases.

0.5 Performance Analysis

0.6 Bibliography

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.1 Appendix

.1.1 Proof of Lennard-Jones Potentials First Derivative

The following proof is provided by the document "Global Optimisation applied to molecular architecture", by WJ Pullan.[16]

The total energy of the system is given by

$V = \sum_{i<j}^{N} (1.0/r_{ij}^{12} - 2.0/r_{ij}^{6})$

Where

$r_{ij} = \sqrt{r_{ij}^2} = \sqrt{x_{ij}^2 + y_{ij}^2}$

Let

$\psi_k = \sum_{a=1}^{k} \alpha_i$

$given(x_0, y_0) = (0, 0)$ and $\psi_0 = 0$ then

$x_i = \sum_{k=0}^{i-1} cos(\psi_k)$ $y_i = \sum_{k=0}^{i-1} sin(\psi_k)$
now

$V_{\alpha_m} = -12 \sum_{i<j} (1.0/r_{ij}^{13} - 1.0/r_{ij}^{7}) r_{ij\alpha_m}$
and

$(r_{ij})_{a_m} = ((x_i - x_j)(x_i - x_j)_{a_m} + (y_i - y_j)(y_i - y_j)_{a_m})/r_{ij}$

Assuming that $j > i$:

$(x_i - x_j)_{a_m} = -\sum_{k=i}^{j-1} (cos(\psi_k))_{a_m} = \sum_{k=max(i,m)}^{j-1} sin(\psi_k)$

$(y_i - y_j)_{a_m} = -\sum_{k=i}^{j-1} (sin(\psi_k))_{a_m} = \sum_{k=max(i,m)}^{j-1} cos(\psi_k)$

Therefore:

$(r_{ij})_{\alpha_m} = ((x_i - x_j)(\sum_{k=max(i,m)}^{j-1} sin(\psi_k)) + (y_i - y_j)(-\sum_{k=max(i,m)}^{j-1} cos(\psi_k)))/r_{ij}$

Which is zero when $m \leq i$. Assuming $m > i$, we have:

$-\sum_{k=m}^{j-1} cos(\psi_k = x_j - x_m$

$\sum_{k=m}^{j-1} cos(\psi_k = y_m - y_j$

and

$(r_{ij})_{\alpha_m} = ((x_i - x_j)(y_m - y_j) + (y_i - y_j)(x_j - x_m))/r_{ij}$

Combining terms we have

$V_{a_m} = -12 \sum_{i=0}^{m-1} \sum_{j=m+1}^{n} (1.0/r_{iij}^{14} - 1.0/r_{ij}^{8})((x_i - x_j)(y_m - y_j) + (y_i - y_j)(x_j - x_m))$

.1.2 Utility Programs

Two utility programs which were used for the testing of this software can be found in the */utilities* directory.

test.shl

This script launches the program for the $n = 2$ to $n = 500$ case, and logs all output to a text file log.txt. It enables the writing of coordinates and alpha values to the */coordinates* and */alphas* folder, and saves the best found minimum energies to the file 'best.csv'.

makegraphs.py

This script takes a file directory as an argument and recursively searches for .csv files which it can use to graph the coordinates of the containing values on the x,y plane. This program is used to generate all of the diagrams used in this report, and in testing is simply provided the */coords* folder. This program has not been written to handle invalid files or different file formats, and was written specifically for the use with this program.

.1.3 Raw Experimental Data For $n = 2$ to $n = 150$ Atom Trials

This section contains the raw output data of the running program for the two to one hundred and fifty atom cases. For each step, at most fifty iterations of random alteration were performed and up to fifty iterations of BFGS were applied. For each 'n' atom case, the tests were performed in the following order:

1. Atom by Atom Optimisation - Line Start
2. Atom by Atom Optimisation - Circle Start
3. Atom by Atom Optimisation - Square Start
4. Iterative Atom Optimisation - Line Start
5. Iterative Atom Optimisation - Circle Start
6. Iterative Atom Optimisation - Square Start
7. Brute Force Atom Optimisation - Line Start
8. Brute Force Atom Optimisation - Circle Start
9. Brute Force Atom Optimisation - Square Start
10. Atom by Atom Line Start - BFGS
11. Atom by Atom Circle Start - BFGS
12. Atom by Atom Square Start - BFGS
13. Iterative Atom Line Start - BFGS
14. Iterative Atom Circle Start - BFGS
15. Iterative Atom Square Start - BFGS
16. Brute Force Atom Line Start - BFGS
17. Brute Force Atom Circle Start - BFGS
18. Brute Force Atom Square Start - BFGS

Atoms	Optimal	Found	Error	Gen	Time
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00

2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
2	-1.00	-1.00	-0.00	50	0.00
Atoms	Optimal	Found	Error	Gen	Time
3	-3.00	-2.88	4.10	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.90	3.50	50	0.00
3	-3.00	-2.99	0.25	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.99	0.44	50	0.01
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.99	0.43	50	0.00
3	-3.00	-2.88	4.10	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.90	3.50	50	0.00
3	-3.00	-2.99	0.25	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.99	0.44	50	0.00
3	-3.00	-3.00	-0.00	50	0.00
3	-3.00	-2.99	0.43	50	0.00
Atoms	Optimal	Found	Error	Gen	Time
4	-5.06	-4.86	3.93	50	0.00
4	-5.06	-4.47	11.65	50	0.00
4	-5.06	-4.47	11.63	50	0.00
4	-5.06	-5.03	0.62	50	0.00
4	-5.06	-4.82	4.69	50	0.00
4	-5.06	-4.47	11.63	50	0.00
4	-5.06	-5.06	0.02	50	0.00
4	-5.06	-4.47	11.65	50	0.00
4	-5.06	-4.47	11.63	50	0.00
4	-5.06	-4.96	1.88	50	0.00
4	-5.06	-4.47	11.59	50	0.00

4	-5.06	-4.47	11.63	50	0.00
4	-5.06	-5.03	0.62	50	0.00
4	-5.06	-4.82	4.69	50	0.00
4	-5.06	-4.47	11.63	50	0.00
4	-5.06	-5.06	-0.00	50	0.01
4	-5.06	-4.47	11.59	50	0.00
4	-5.06	-4.47	11.63	50	0.00
Atoms	Optimal	Found	Error	Gen	Time
5	-7.16	-7.01	2.16	50	0.00
5	-7.16	-4.85	32.27	50	0.00
5	-7.16	-6.53	8.89	50	0.00
5	-7.16	-6.54	8.70	50	0.00
5	-7.16	-5.55	22.57	50	0.00
5	-7.16	-6.52	9.04	50	0.00
5	-7.16	-7.15	0.15	50	0.00
5	-7.16	-5.54	22.65	50	0.00
5	-7.16	-6.54	8.68	50	0.00
5	-7.16	-7.14	0.39	50	0.00
5	-7.16	-4.85	32.27	50	0.01
5	-7.16	-6.55	8.53	50	0.00
5	-7.16	-6.55	8.51	50	0.00
5	-7.16	-5.87	18.09	50	0.00
5	-7.16	-6.52	8.97	50	0.02
5	-7.16	-7.16	-0.00	50	0.00
5	-7.16	-5.91	17.56	50	0.00
5	-7.16	-6.55	8.62	50	0.00
Atoms	Optimal	Found	Error	Gen	Time
6	-9.35	-9.20	1.70	50	0.00
6	-9.35	-9.15	2.23	50	0.00
6	-9.35	-7.17	23.36	50	0.00
6	-9.35	-7.93	15.22	50	0.00
6	-9.35	-9.35	0.02	50	0.02
6	-9.35	-8.03	14.14	50	0.00
6	-9.35	-9.34	0.20	50	0.00
6	-9.35	-9.35	0.02	50	0.00
6	-9.35	-7.99	14.64	50	0.00
6	-9.35	-9.32	0.36	50	0.00
6	-9.35	-9.35	-0.00	50	0.01
6	-9.35	-8.67	7.33	50	0.00
6	-9.35	-8.23	11.97	50	0.02
6	-9.35	-9.35	0.00	50	0.00
6	-9.35	-8.67	7.37	50	0.00
6	-9.35	-9.35	0.10	50	0.02
6	-9.35	-9.35	0.00	50	0.00
6	-9.35	-8.66	7.40	50	0.01

Atoms	Optimal	Found	Error	Gen	Time
7	-12.52	-12.10	3.33	50	0.00
7	-12.52	-12.24	2.22	50	0.00
7	-12.52	-10.15	18.95	50	0.00
7	-12.52	-10.81	13.62	50	0.00
7	-12.52	-12.26	2.04	50	0.01
7	-12.52	-10.11	19.21	50	0.00
7	-12.52	-12.48	0.33	50	0.00
7	-12.52	-11.56	7.66	50	0.00
7	-12.52	-10.17	18.76	50	0.02
7	-12.52	-12.48	0.32	50	0.00
7	-12.52	-12.37	1.20	50	0.01
7	-12.52	-11.03	11.93	50	0.00
7	-12.52	-12.40	0.94	50	0.02
7	-12.52	-12.52	-0.00	50	0.00
7	-12.52	-10.21	18.46	50	0.02
7	-12.52	-12.52	0.02	50	0.01
7	-12.52	-12.50	0.17	50	0.00
7	-12.52	-11.09	11.39	50	0.02
Atoms	Optimal	Found	Error	Gen	Time
8	-14.68	-14.20	3.25	50	0.00
8	-14.68	-12.81	12.71	50	0.01
8	-14.68	-11.72	20.11	50	0.00
8	-14.68	-11.62	20.82	50	0.00
8	-14.68	-12.75	13.10	50	0.02
8	-14.68	-13.04	11.16	50	0.00
8	-14.68	-14.61	0.45	50	0.01
8	-14.68	-12.39	15.60	50	0.00
8	-14.68	-11.92	18.80	50	0.00
8	-14.68	-14.63	0.34	50	0.02
8	-14.68	-14.68	-0.00	50	0.00
8	-14.68	-13.22	9.91	50	0.02
8	-14.68	-11.64	20.71	50	0.03
8	-14.68	-12.77	13.01	50	0.02
8	-14.68	-13.09	10.80	50	0.01
8	-14.68	-14.66	0.11	50	0.02
8	-14.68	-14.66	0.14	50	0.00
8	-14.68	-12.22	16.71	50	0.01
Atoms	Optimal	Found	Error	Gen	Time
9	-16.85	-16.31	3.26	50	0.01
9	-16.85	-14.89	11.68	50	0.00
9	-16.85	-14.00	16.94	50	0.02
9	-16.85	-13.28	21.19	50	0.01
9	-16.85	-12.96	23.13	50	0.00
9	-16.85	-13.31	21.03	50	0.02

9	-16.85	-16.81	0.29	50	0.00
9	-16.85	-13.89	17.60	50	0.00
9	-16.85	-13.93	17.37	50	0.02
9	-16.85	-16.82	0.21	50	0.00
9	-16.85	-16.81	0.25	50	0.01
9	-16.85	-15.32	9.10	50	0.02
9	-16.85	-11.64	30.96	50	0.03
9	-16.85	-16.04	4.84	50	0.00
9	-16.85	-15.07	10.61	50	0.03
9	-16.85	-16.85	-0.00	50	0.02
9	-16.85	-13.85	17.82	50	0.03
9	-16.85	-15.43	8.47	50	0.02
Atoms	Optimal	Found	Error	Gen	Time
10	-20.08	-19.23	4.21	50	0.01
10	-20.08	-17.68	11.95	50	0.02
10	-20.08	-15.86	20.97	50	0.01
10	-20.08	-14.78	26.39	50	0.00
10	-20.08	-16.13	19.66	50	0.02
10	-20.08	-15.18	24.38	50	0.02
10	-20.08	-20.02	0.26	50	0.01
10	-20.08	-18.42	8.23	50	0.00
10	-20.08	-16.06	19.99	50	0.02
10	-20.08	-20.07	0.05	50	0.02
10	-20.08	-20.07	0.03	50	0.00
10	-20.08	-16.36	18.52	50	0.03
10	-20.08	-12.62	37.12	50	0.03
10	-20.08	-16.57	17.46	50	0.03
10	-20.08	-17.11	14.77	50	0.03
10	-20.08	-20.08	-0.00	50	0.03
10	-20.08	-18.75	6.60	50	0.03
10	-20.08	-17.58	12.41	50	0.02
Atoms	Optimal	Found	Error	Gen	Time
11	-22.31	-21.46	3.81	50	0.01
11	-22.31	-19.27	13.64	50	0.02
11	-22.31	-16.95	24.04	50	0.01
11	-22.31	-17.40	21.99	50	0.02
11	-22.31	-18.39	17.57	50	0.03
11	-22.31	-17.02	23.70	50	0.02
11	-22.31	-22.26	0.25	50	0.00
11	-22.31	-19.70	11.72	50	0.02
11	-22.31	-17.68	20.75	50	0.01
11	-22.31	-22.28	0.15	50	0.00
11	-22.31	-20.15	9.70	50	0.05
11	-22.31	-20.15	9.70	50	0.02
11	-22.31	-17.75	20.43	50	0.05

11	-22.31	-18.37	17.65	50	0.06
11	-22.31	-20.37	8.70	50	0.03
11	-22.31	-22.31	-0.00	50	0.05
11	-22.31	-20.25	9.22	50	0.02
11	-22.31	-18.19	18.49	50	0.05
Atoms	Optimal	Found	Error	Gen	Time
12	-25.53	-25.11	1.65	50	0.01
12	-25.53	-22.47	11.98	50	0.02
12	-25.53	-22.01	13.78	50	0.03
12	-25.53	-19.64	23.05	50	0.02
12	-25.53	-19.29	24.45	50	0.03
12	-25.53	-19.35	24.19	50	0.03
12	-25.53	-25.44	0.35	50	0.02
12	-25.53	-22.71	11.03	50	0.00
12	-25.53	-21.57	15.49	50	0.01
12	-25.53	-25.52	0.01	50	0.05
12	-25.53	-23.00	9.91	50	0.06
12	-25.53	-22.60	11.47	50	0.01
12	-25.53	-19.71	22.79	50	0.06
12	-25.53	-22.96	10.05	50	0.03
12	-25.53	-20.25	20.68	50	0.06
12	-25.53	-25.53	-0.00	50	0.06
12	-25.53	-23.23	8.99	50	0.05
12	-25.53	-22.15	13.23	50	0.05
Atoms	Optimal	Found	Error	Gen	Time
13	-27.75	-26.73	3.69	50	0.03
13	-27.75	-24.46	11.88	50	0.03
13	-27.75	-24.33	12.33	50	0.03
13	-27.75	-21.03	24.24	50	0.03
13	-27.75	-21.24	23.45	50	0.03
13	-27.75	-20.47	26.23	50	0.03
13	-27.75	-27.66	0.32	50	0.02
13	-27.75	-24.46	11.87	50	0.01
13	-27.75	-24.25	12.62	50	0.02
13	-27.75	-27.38	1.34	50	0.03
13	-27.75	-25.12	9.48	50	0.06
13	-27.75	-24.91	10.24	50	0.06
13	-27.75	-21.49	22.59	50	0.06
13	-27.75	-21.93	20.99	50	0.06
13	-27.75	-21.15	23.80	50	0.08
13	-27.75	-27.75	-0.00	50	0.08
13	-27.75	-25.69	7.44	50	0.09
13	-27.75	-24.57	11.46	50	0.08
Atoms	Optimal	Found	Error	Gen	Time
14	-30.98	-29.90	3.51	50	0.03

14	-30.98	-26.15	15.61	50	0.03
14	-30.98	-25.44	17.89	50	0.05
14	-30.98	-23.76	23.30	50	0.03
14	-30.98	-21.25	31.43	50	0.05
14	-30.98	-23.08	25.51	50	0.05
14	-30.98	-30.89	0.31	50	0.02
14	-30.98	-27.20	12.21	50	0.01
14	-30.98	-24.63	20.50	50	0.03
14	-30.98	-30.62	1.17	50	0.09
14	-30.98	-27.35	11.72	50	0.06
14	-30.98	-26.95	13.03	50	0.03
14	-30.98	-23.98	22.60	50	0.09
14	-30.98	-21.56	30.42	50	0.09
14	-30.98	-27.16	12.33	50	0.06
14	-30.98	-30.98	-0.00	50	0.09
14	-30.98	-28.42	8.27	50	0.03
14	-30.98	-25.66	17.19	50	0.09
Atoms	Optimal	Found	Error	Gen	Time
15	-33.23	-33.09	0.44	50	0.05
15	-33.23	-28.85	13.19	50	0.05
15	-33.23	-28.64	13.81	50	0.05
15	-33.23	-24.03	27.68	50	0.05
15	-33.23	-20.51	38.29	50	0.05
15	-33.23	-21.48	35.37	50	0.05
15	-33.23	-33.12	0.33	50	0.03
15	-33.23	-28.75	13.50	50	0.03
15	-33.23	-29.84	10.22	50	0.03
15	-33.23	-33.23	-0.00	50	0.06
15	-33.23	-30.57	8.00	50	0.05
15	-33.23	-29.50	11.22	50	0.06
15	-33.23	-25.59	22.99	50	0.11
15	-33.23	-23.03	30.71	50	0.09
15	-33.23	-21.69	34.73	50	0.12
15	-33.23	-33.22	0.05	50	0.09
15	-33.23	-29.58	11.00	50	0.11
15	-33.23	-30.29	8.87	50	0.14
Atoms	Optimal	Found	Error	Gen	Time
16	-36.45	-33.59	7.85	50	0.05
16	-36.45	-32.87	9.82	50	0.06
16	-36.45	-29.35	19.47	50	0.06
16	-36.45	-22.54	38.16	50	0.06
16	-36.45	-26.96	26.04	50	0.06
16	-36.45	-27.79	23.78	50	0.06
16	-36.45	-36.30	0.41	50	0.03
16	-36.45	-31.46	13.69	50	0.03

16	-36.45	-31.86	12.61	50	0.03
16	-36.45	-34.02	6.68	50	0.14
16	-36.45	-33.13	9.12	50	0.16
16	-36.45	-31.17	14.50	50	0.12
16	-36.45	-23.07	36.70	50	0.12
16	-36.45	-29.42	19.29	50	0.11
16	-36.45	-29.38	19.39	50	0.05
16	-36.45	-36.45	-0.00	50	0.14
16	-36.45	-32.54	10.74	50	0.12
16	-36.45	-32.20	11.68	50	0.17
Atoms	Optimal	Found	Error	Gen	Time
17	-38.69	-36.12	6.65	50	0.08
17	-38.69	-34.36	11.19	50	0.06
17	-38.69	-31.68	18.13	50	0.08
17	-38.69	-28.78	25.63	50	0.08
17	-38.69	-23.37	39.60	50	0.08
17	-38.69	-27.56	28.78	50	0.06
17	-38.69	-38.55	0.38	50	0.05
17	-38.69	-32.65	15.61	50	0.03
17	-38.69	-33.55	13.30	50	0.05
17	-38.69	-38.29	1.04	50	0.11
17	-38.69	-34.46	10.95	50	0.16
17	-38.69	-32.93	14.91	50	0.12
17	-38.69	-31.72	18.02	50	0.11
17	-38.69	-26.30	32.02	50	0.03
17	-38.69	-27.96	27.73	50	0.12
17	-38.69	-38.69	-0.00	50	0.17
17	-38.69	-33.80	12.66	50	0.19
17	-38.69	-34.09	11.89	50	0.19
Atoms	Optimal	Found	Error	Gen	Time
18	-42.01	-37.92	9.74	50	0.09
18	-42.01	-34.40	18.10	50	0.08
18	-42.01	-35.24	16.11	50	0.09
18	-42.01	-24.15	42.50	50	0.08
18	-42.01	-31.29	25.51	50	0.09
18	-42.01	-28.27	32.71	50	0.08
18	-42.01	-41.80	0.49	50	0.05
18	-42.01	-36.77	12.48	50	0.06
18	-42.01	-34.10	18.83	50	0.05
18	-42.01	-38.11	9.28	50	0.23
18	-42.01	-37.61	10.46	50	0.06
18	-42.01	-36.11	14.03	50	0.17
18	-42.01	-29.38	30.07	50	0.09
18	-42.01	-33.65	19.90	50	0.12
18	-42.01	-29.37	30.08	50	0.20

18	-42.01	-42.01	-0.00	50	0.14
18	-42.01	-37.24	11.35	50	0.17
18	-42.01	-34.72	17.36	50	0.20
Atoms	Optimal	Found	Error	Gen	Time
19	-45.26	-43.21	4.53	50	0.11
19	-45.26	-41.23	8.90	50	0.09
19	-45.26	-35.41	21.76	50	0.11
19	-45.26	-30.24	33.18	50	0.09
19	-45.26	-32.91	27.29	50	0.11
19	-45.26	-28.63	36.75	50	0.11
19	-45.26	-44.99	0.59	50	0.06
19	-45.26	-37.99	16.06	50	0.05
19	-45.26	-36.40	19.57	50	0.06
19	-45.26	-43.57	3.74	50	0.23
19	-45.26	-41.82	7.59	50	0.17
19	-45.26	-37.25	17.70	50	0.25
19	-45.26	-31.49	30.43	50	0.23
19	-45.26	-33.55	25.88	50	0.27
19	-45.26	-28.82	36.32	50	0.28
19	-45.26	-45.26	-0.00	50	0.19
19	-45.26	-38.30	15.38	50	0.22
19	-45.26	-37.04	18.16	50	0.23
Atoms	Optimal	Found	Error	Gen	Time
20	-47.49	-47.28	0.43	50	0.12
20	-47.49	-41.67	12.26	50	0.11
20	-47.49	-36.91	22.27	50	0.12
20	-47.49	-36.47	23.20	50	0.12
20	-47.49	308.72	750.08	50	0.12
20	-47.49	-33.23	30.03	50	0.11
20	-47.49	-47.21	0.59	50	0.08
20	-47.49	-41.00	13.67	50	0.06
20	-47.49	-38.14	19.69	50	0.06
20	-47.49	-47.44	0.10	50	0.25
20	-47.49	-42.78	9.92	50	0.20
20	-47.49	-37.62	20.78	50	0.31
20	-47.49	-37.67	20.67	50	0.28
20	-47.49	161.76	440.62	50	0.23
20	-47.49	-33.64	29.17	50	0.33
20	-47.49	-47.49	-0.00	50	0.23
20	-47.49	-41.89	11.80	50	0.20
20	-47.49	-39.74	16.33	50	0.28
Atoms	Optimal	Found	Error	Gen	Time
21	-50.73	-48.46	4.46	50	0.14
21	-50.73	-43.04	15.14	50	0.14
21	-50.73	-43.05	15.14	50	0.14

21	-50.73	-29.07	42.69	50	0.14
21	-50.73	-26.31	48.14	50	0.14
21	-50.73	-36.16	28.71	50	0.14
21	-50.73	-50.43	0.58	50	0.08
21	-50.73	-45.45	10.40	50	0.06
21	-50.73	-42.72	15.78	50	0.08
21	-50.73	-50.25	0.93	50	0.20
21	-50.73	-44.21	12.85	50	0.33
21	-50.73	-43.87	13.52	50	0.20
21	-50.73	-30.22	40.42	50	0.19
21	-50.73	-26.50	47.75	50	0.12
21	-50.73	-36.29	28.46	50	0.38
21	-50.73	-50.73	-0.00	50	0.27
21	-50.73	-45.83	9.65	50	0.34
21	-50.73	-43.33	14.59	50	0.30
Atoms	Optimal	Found	Error	Gen	Time
22	-52.97	-50.31	5.02	50	0.16
22	-52.97	-47.69	9.97	50	0.16
22	-52.97	-43.93	17.07	50	0.16
22	-52.97	-37.72	28.78	50	0.17
22	-52.97	-39.42	25.58	50	0.16
22	-52.97	-28.68	45.86	50	0.16
22	-52.97	-52.68	0.56	50	0.09
22	-52.97	-47.91	9.55	50	0.08
22	-52.97	-45.77	13.59	50	0.09
22	-52.97	-51.60	2.58	50	0.41
22	-52.97	-48.32	8.78	50	0.30
22	-52.97	-45.33	14.43	50	0.31
22	-52.97	-39.44	25.55	50	0.27
22	-52.97	-39.92	24.63	50	0.44
22	-52.97	-30.18	43.03	50	0.25
22	-52.97	-52.97	-0.00	50	0.31
22	-52.97	-50.31	5.03	50	0.14
22	-52.97	-47.76	9.84	50	0.20
Atoms	Optimal	Found	Error	Gen	Time
23	-56.29	-50.11	10.98	50	0.19
23	-56.29	-50.44	10.40	50	0.19
23	-56.29	-43.04	23.54	50	0.19
23	-56.29	-38.88	30.94	50	0.19
23	-56.29	-40.55	27.96	50	0.19
23	-56.29	-36.70	34.80	50	0.20
23	-56.29	-55.98	0.55	50	0.09
23	-56.29	-49.98	11.20	50	0.09
23	-56.29	-46.56	17.28	50	0.11
23	-56.29	-53.43	5.09	50	0.38

23	-56.29	-52.42	6.88	50	0.14
23	-56.29	-43.69	22.39	50	0.47
23	-56.29	-40.97	27.22	50	0.36
23	-56.29	-43.08	23.47	50	0.14
23	-56.29	-36.87	34.50	50	0.48
23	-56.29	-56.29	-0.00	50	0.23
23	-56.29	-51.39	8.71	50	0.31
23	-56.29	-47.29	15.99	50	0.42
Atoms	Optimal	Found	Error	Gen	Time
24	-59.56	-57.11	4.12	50	0.20
24	-59.56	-53.49	10.20	50	0.22
24	-59.56	-48.19	19.09	50	0.20
24	-59.56	-42.30	28.98	50	0.22
24	-59.56	-31.30	47.44	50	0.22
24	-59.56	-35.78	39.92	50	0.22
24	-59.56	-59.24	0.54	50	0.12
24	-59.56	-52.46	11.93	50	0.11
24	-59.56	-49.84	16.32	50	0.11
24	-59.56	-58.88	1.16	50	0.33
24	-59.56	-54.40	8.67	50	0.53
24	-59.56	-49.40	17.06	50	0.45
24	-59.56	-48.08	19.27	50	0.30
24	-59.56	-31.50	47.11	50	0.52
24	-59.56	-36.57	38.60	50	0.42
24	-59.56	-59.56	-0.00	50	0.33
24	-59.56	-53.51	10.17	50	0.52
24	-59.56	-50.79	14.73	50	0.55
Atoms	Optimal	Found	Error	Gen	Time
25	-61.81	-59.46	3.79	50	0.23
25	-61.81	-54.77	11.38	50	0.22
25	-61.81	-52.96	14.32	50	0.25
25	-61.81	-48.62	21.33	50	0.25
25	-61.81	-31.88	48.42	50	0.23
25	-61.81	-41.28	33.22	50	0.25
25	-61.81	-61.48	0.53	50	0.12
25	-61.81	-55.33	10.49	50	0.14
25	-61.81	-52.49	15.08	50	0.12
25	-61.81	-61.17	1.03	50	0.22
25	-61.81	-55.46	10.26	50	0.42
25	-61.81	-54.18	12.34	50	0.50
25	-61.81	-49.07	20.61	50	0.61
25	-61.81	-32.12	48.04	50	0.34
25	-61.81	-41.37	33.07	50	0.66
25	-61.81	-61.81	-0.00	50	0.33
25	-61.81	-56.80	8.10	50	0.38

25	-61.81	-53.44	13.54	50	0.62
Atoms	Optimal	Found	Error	Gen	Time
26	-65.13	-62.79	3.59	50	0.27
26	-65.13	-57.73	11.36	50	0.28
26	-65.13	-53.49	17.88	50	0.27
26	-65.13	-42.30	35.06	50	0.28
26	-65.13	-34.23	47.44	50	0.28
26	-65.13	-44.04	32.39	50	0.28
26	-65.13	-64.75	0.59	50	0.14
26	-65.13	-58.28	10.52	50	0.14
26	-65.13	-54.03	17.05	50	0.16
26	-65.13	-63.18	3.00	50	0.66
26	-65.13	-59.33	8.91	50	0.50
26	-65.13	-54.92	15.68	50	0.59
26	-65.13	-48.33	25.79	50	0.11
26	-65.13	-35.00	46.26	50	0.34
26	-65.13	-44.21	32.12	50	0.62
26	-65.13	-65.13	-0.00	50	0.27
26	-65.13	-58.75	9.79	50	0.61
26	-65.13	-55.14	15.34	50	0.62
Atoms	Optimal	Found	Error	Gen	Time
27	-68.40	-64.62	5.52	50	0.30
27	-68.40	-57.73	15.59	50	0.31
27	-68.40	-54.29	20.62	50	0.30
27	-68.40	-39.54	42.19	50	0.31
27	-68.40	-47.97	29.87	50	0.31
27	-68.40	-45.29	33.78	50	0.30
27	-68.40	-67.95	0.65	50	0.17
27	-68.40	-59.43	13.10	50	0.16
27	-68.40	-55.19	19.31	50	0.16
27	-68.40	-67.33	1.56	50	0.30
27	-68.40	-59.11	13.58	50	0.61
27	-68.40	-55.70	18.56	50	0.41
27	-68.40	-42.04	38.53	50	0.31
27	-68.40	-48.26	29.44	50	0.78
27	-68.40	-51.39	24.87	50	0.55
27	-68.40	-68.40	-0.00	50	0.44
27	-68.40	-61.30	10.38	50	0.52
27	-68.40	-56.00	18.12	50	0.73
Atoms	Optimal	Found	Error	Gen	Time
28	-70.63	-68.45	3.09	50	0.33
28	-70.63	-60.49	14.36	50	0.34
28	-70.63	-57.77	18.21	50	0.34
28	-70.63	-43.24	38.78	50	0.36
28	-70.63	-43.53	38.37	50	0.34

28	-70.63	-41.73	40.92	50	0.36
28	-70.63	-70.16	0.67	50	0.19
28	-70.63	-63.44	10.18	50	0.17
28	-70.63	-57.76	18.23	50	0.19
28	-70.63	-68.95	2.38	50	0.58
28	-70.63	-64.39	8.85	50	0.42
28	-70.63	-59.87	15.24	50	0.44
28	-70.63	-46.40	34.31	50	0.23
28	-70.63	-45.69	35.32	50	0.31
28	-70.63	-50.33	28.75	50	0.12
28	-70.63	-70.63	-0.00	50	0.52
28	-70.63	-64.40	8.82	50	0.55
28	-70.63	-58.34	17.41	50	0.81
Atoms	Optimal	Found	Error	Gen	Time
29	-73.95	-66.33	10.31	50	0.39
29	-73.95	-65.70	11.16	50	0.39
29	-73.95	-56.18	24.03	50	0.39
29	-73.95	-44.13	40.33	50	0.39
29	-73.95	-44.43	39.92	50	0.39
29	-73.95	-44.87	39.33	50	0.39
29	-73.95	-73.43	0.70	50	0.20
29	-73.95	-66.52	10.05	50	0.20
29	-73.95	-59.10	20.08	50	0.20
29	-73.95	-71.63	3.14	50	0.67
29	-73.95	-66.82	9.64	50	0.67
29	-73.95	-57.42	22.35	50	0.91
29	-73.95	-45.04	39.10	50	0.81
29	-73.95	-45.10	39.02	50	1.05
29	-73.95	-49.46	33.12	50	0.33
29	-73.95	-73.95	-0.00	50	0.50
29	-73.95	-67.05	9.34	50	0.78
29	-73.95	-59.85	19.07	50	0.97
Atoms	Optimal	Found	Error	Gen	Time
30	-77.23	-73.70	4.57	50	0.44
30	-77.23	-70.84	8.27	50	0.41
30	-77.23	-61.33	20.59	50	0.42
30	-77.23	-48.38	37.35	50	0.44
30	-77.23	-48.96	36.61	50	0.42
30	-77.23	-40.59	47.44	50	0.44
30	-77.23	-76.65	0.75	50	0.23
30	-77.23	-66.44	13.97	50	0.23
30	-77.23	-66.82	13.48	50	0.22
30	-77.23	-76.44	1.02	50	0.78
30	-77.23	-72.33	6.34	50	0.52
30	-77.23	-61.92	19.82	50	0.81

30	-77.23	-49.01	36.53	50	0.88
30	-77.23	-52.90	31.50	50	0.41
30	-77.23	-46.39	39.93	50	0.45
30	-77.23	-77.23	-0.00	50	0.48
30	-77.23	-70.64	8.53	50	0.19
30	-77.23	-67.47	12.64	50	0.72
Atoms	Optimal	Found	Error	Gen	Time
31	-79.48	-73.35	7.72	50	0.47
31	-79.48	-69.05	13.12	50	0.47
31	-79.48	-65.15	18.02	50	0.45
31	-79.48	-44.67	43.79	50	0.48
31	-79.48	-44.66	43.81	50	0.45
31	-79.48	-50.58	36.35	50	0.47
31	-79.48	-78.86	0.77	50	0.27
31	-79.48	-69.90	12.06	50	0.25
31	-79.48	-67.55	15.01	50	0.25
31	-79.48	-76.21	4.11	50	1.05
31	-79.48	-71.91	9.53	50	0.38
31	-79.48	-68.81	13.43	50	0.36
31	-79.48	-45.42	42.85	50	0.67
31	-79.48	-46.82	41.09	50	0.59
31	-79.48	-52.55	33.88	50	0.27
31	-79.48	-79.48	-0.00	50	0.53
31	-79.48	-72.89	8.28	50	0.28
31	-79.48	-69.97	11.96	50	0.89
Atoms	Optimal	Found	Error	Gen	Time
32	-82.80	-74.52	10.00	50	0.53
32	-82.80	-72.70	12.19	50	0.52
32	-82.80	-62.80	24.15	50	0.53
32	-82.80	-54.40	34.30	50	0.52
32	-82.80	-37.81	54.33	50	0.53
32	-82.80	-59.68	27.92	50	0.53
32	-82.80	-82.17	0.76	50	0.30
32	-82.80	-72.34	12.63	50	0.28
32	-82.80	-69.10	16.54	50	0.27
32	-82.80	-79.61	3.85	50	0.72
32	-82.80	-74.88	9.57	50	0.73
32	-82.80	-64.05	22.64	50	1.44
32	-82.80	-59.76	27.82	50	0.48
32	-82.80	-40.78	50.75	50	0.86
32	-82.80	-61.89	25.25	50	1.06
32	-82.80	-82.80	-0.00	50	0.47
32	-82.80	-74.99	9.43	50	0.67
32	-82.80	-71.49	13.66	50	0.98
Atoms	Optimal	Found	Error	Gen	Time

33	-86.07	-77.19	10.32	50	0.58
33	-86.07	-68.16	20.81	50	0.56
33	-86.07	-69.97	18.71	50	0.58
33	-86.07	-48.55	43.59	50	0.58
33	-86.07	-56.60	34.25	50	0.58
33	-86.07	-60.89	29.25	50	0.58
33	-86.07	-85.37	0.82	50	0.31
33	-86.07	-76.29	11.36	50	0.33
33	-86.07	-68.60	20.30	50	0.30
33	-86.07	-81.68	5.11	50	0.94
33	-86.07	-74.52	13.42	50	0.66
33	-86.07	-73.07	15.11	50	0.86
33	-86.07	-51.05	40.70	50	0.92
33	-86.07	-57.92	32.71	50	1.34
33	-86.07	-62.97	26.84	50	0.77
33	-86.07	-86.07	-0.00	50	0.42
33	-86.07	-79.25	7.92	50	1.24
33	-86.07	-69.42	19.34	50	1.33
Atoms	Optimal	Found	Error	Gen	Time
34	-88.31	-81.92	7.24	50	0.62
34	-88.31	-78.42	11.20	50	0.64
34	-88.31	-70.68	19.97	50	0.62
34	-88.31	-50.21	43.14	50	0.64
34	-88.31	-50.39	42.94	50	0.61
34	-88.31	-52.58	40.46	50	0.64
34	-88.31	-87.60	0.81	50	0.34
34	-88.31	-79.07	10.47	50	0.34
34	-88.31	-71.05	19.54	50	0.34
34	-88.31	-85.72	2.93	50	1.20
34	-88.31	-79.03	10.51	50	1.11
34	-88.31	-75.31	14.72	50	0.84
34	-88.31	-51.20	42.02	50	1.33
34	-88.31	-50.76	42.52	50	1.47
34	-88.31	-58.49	33.77	50	0.38
34	-88.31	-88.31	-0.00	50	0.34
34	-88.31	-80.18	9.21	50	1.34
34	-88.31	-72.26	18.18	50	1.19
Atoms	Optimal	Found	Error	Gen	Time
35	-91.65	-86.13	6.01	50	0.69
35	-91.65	-83.82	8.53	50	0.70
35	-91.65	-71.53	21.95	50	0.66
35	-91.65	-56.74	38.08	50	0.69
35	-91.65	-55.23	39.73	50	0.70
35	-91.65	-53.78	41.32	50	0.67
35	-91.65	-90.90	0.81	50	0.38

35	-91.65	-82.29	10.21	50	0.38
35	-91.65	-73.21	20.12	50	0.36
35	-91.65	-88.29	3.66	50	1.44
35	-91.65	-85.17	7.07	50	1.36
35	-91.65	-75.25	17.89	50	0.78
35	-91.65	-59.16	35.45	50	0.58
35	-91.65	-56.75	38.07	50	1.31
35	-91.65	-55.82	39.09	50	1.34
35	-91.65	-91.65	-0.00	50	0.55
35	-91.65	-83.72	8.65	50	1.53
35	-91.65	-74.04	19.21	50	1.58
Atoms	Optimal	Found	Error	Gen	Time
36	-95.00	-88.58	6.75	50	0.75
36	-95.00	-84.33	11.23	50	0.75
36	-95.00	-77.67	18.24	50	0.73
36	-95.00	-55.26	41.83	50	0.75
36	-95.00	-55.52	41.55	50	0.75
36	-95.00	-61.71	35.04	50	0.75
36	-95.00	-94.24	0.80	50	0.41
36	-95.00	-83.03	12.59	50	0.39
36	-95.00	-77.41	18.51	50	0.41
36	-95.00	-91.90	3.26	50	1.36
36	-95.00	-88.43	6.91	50	0.58
36	-95.00	-80.33	15.44	50	0.70
36	-95.00	-58.13	38.80	50	0.39
36	-95.00	-56.73	40.28	50	1.08
36	-95.00	-64.16	32.47	50	0.88
36	-95.00	-95.00	-0.00	50	0.72
36	-95.00	-85.39	10.12	50	1.30
36	-95.00	-80.67	15.08	50	1.09
Atoms	Optimal	Found	Error	Gen	Time
37	-98.26	-93.33	5.02	50	0.81
37	-98.26	-87.74	10.71	50	0.81
37	-98.26	-77.72	20.90	50	0.81
37	-98.26	-59.18	39.77	50	0.80
37	-98.26	-60.90	38.02	50	0.81
37	-98.26	-54.08	44.97	50	0.81
37	-98.26	-97.51	0.76	50	0.44
37	-98.26	-85.68	12.81	50	0.44
37	-98.26	-79.52	19.07	50	0.44
37	-98.26	-96.47	1.82	50	0.89
37	-98.26	-88.92	9.51	50	1.30
37	-98.26	-82.59	15.95	50	1.25
37	-98.26	-64.14	34.72	50	0.58
37	-98.26	-64.06	34.81	50	0.78

37	-98.26	-56.57	42.42	50	1.02
37	-98.26	-98.26	-0.00	50	0.55
37	-98.26	-87.76	10.69	50	1.61
37	-98.26	-83.01	15.52	50	1.42
Atoms	Optimal	Found	Error	Gen	Time
38	-100.52	-87.58	12.86	50	0.88
38	-100.52	-84.08	16.35	50	0.86
38	-100.52	-66.94	33.40	50	0.88
38	-100.52	-63.48	36.85	50	0.86
38	-100.52	-60.83	39.48	50	0.91
38	-100.52	-62.61	37.71	50	0.88
38	-100.52	-99.75	0.76	50	0.48
38	-100.52	-86.56	13.89	50	0.48
38	-100.52	-80.05	20.36	50	0.48
38	-100.52	-95.08	5.41	50	0.56
38	-100.52	-88.11	12.34	50	1.11
38	-100.52	-69.95	30.41	50	1.75
38	-100.52	-66.86	33.48	50	1.05
38	-100.52	-62.63	37.69	50	1.22
38	-100.52	-63.49	36.83	50	2.06
38	-100.52	-100.52	-0.00	50	0.42
38	-100.52	-88.29	12.17	50	1.76
38	-100.52	-86.07	14.37	50	1.31
Atoms	Optimal	Found	Error	Gen	Time
39	-103.83	-94.32	9.15	50	0.95
39	-103.83	-95.47	8.05	50	0.95
39	-103.83	-83.32	19.75	50	0.95
39	-103.83	-64.68	37.71	50	0.95
39	-103.83	-61.01	41.24	50	0.97
39	-103.83	-62.10	40.19	50	0.94
39	-103.83	-103.00	0.79	50	0.52
39	-103.83	-89.21	14.08	50	0.50
39	-103.83	-84.69	18.43	50	0.50
39	-103.83	-98.43	5.20	50	0.66
39	-103.83	-97.01	6.57	50	1.00
39	-103.83	-85.15	17.99	50	1.59
39	-103.83	-67.15	35.32	50	1.26
39	-103.83	-61.62	40.65	50	1.16
39	-103.83	-63.28	39.06	50	1.47
39	-103.83	-103.83	-0.00	50	0.33
39	-103.83	-90.74	12.60	50	1.70
39	-103.83	-87.16	16.05	50	1.74
Atoms	Optimal	Found	Error	Gen	Time
40	-107.11	-100.07	6.57	50	1.03
40	-107.11	-91.12	14.93	50	1.00

40	-107.11	-85.07	20.57	50	1.03
40	-107.11	-62.27	41.86	50	1.05
40	-107.11	-63.10	41.08	50	1.05
40	-107.11	-67.77	36.73	50	1.05
40	-107.11	-106.21	0.84	50	0.56
40	-107.11	-91.07	14.98	50	0.55
40	-107.11	-87.82	18.01	50	0.55
40	-107.11	-104.49	2.44	50	0.28
40	-107.11	-96.99	9.45	50	1.05
40	-107.11	-87.85	17.97	50	1.25
40	-107.11	-70.99	33.72	50	0.31
40	-107.11	-70.00	34.64	50	0.31
40	-107.11	-71.56	33.19	50	0.45
40	-107.11	-107.11	-0.00	50	0.47
40	-107.11	-93.58	12.63	50	1.48
40	-107.11	-90.38	15.62	50	1.31
Atoms	Optimal	Found	Error	Gen	Time
41	-109.35	-94.20	13.86	50	1.14
41	-109.35	-97.54	10.80	50	1.08
41	-109.35	-83.23	23.89	50	1.12
41	-109.35	-60.97	44.24	50	1.12
41	-109.35	-69.47	36.47	50	1.14
41	-109.35	-58.87	46.16	50	1.14
41	-109.35	-108.46	0.82	50	0.61
41	-109.35	-96.28	11.95	50	0.58
41	-109.35	-88.65	18.93	50	0.61
41	-109.35	-99.03	9.44	50	2.39
41	-109.35	-98.74	9.70	50	1.77
41	-109.35	-89.91	17.78	50	1.69
41	-109.35	-65.87	39.77	50	0.30
41	-109.35	-70.48	35.55	50	2.17
41	-109.35	-62.35	42.98	50	1.72
41	-109.35	-109.35	-0.00	50	0.44
41	-109.35	-97.80	10.57	50	1.86
41	-109.35	-91.46	16.36	50	1.69
Atoms	Optimal	Found	Error	Gen	Time
42	-112.68	-104.41	7.34	50	1.19
42	-112.68	-98.00	13.03	50	1.19
42	-112.68	-88.79	21.21	50	1.17
42	-112.68	-59.64	47.07	50	1.20
42	-112.68	-68.64	39.08	50	1.22
42	-112.68	-60.92	45.94	50	1.23
42	-112.68	-111.77	0.81	50	0.64
42	-112.68	-99.21	11.95	50	0.64
42	-112.68	-89.35	20.71	50	0.64

42	-112.68	-109.85	2.51	50	0.44
42	-112.68	-99.86	11.38	50	1.94
42	-112.68	-91.98	18.37	50	1.72
42	-112.68	-63.88	43.31	50	0.41
42	-112.68	-73.40	34.86	50	1.94
42	-112.68	-65.76	41.64	50	1.33
42	-112.68	-112.68	-0.00	50	0.39
42	-112.68	-100.84	10.51	50	1.92
42	-112.68	-92.90	17.56	50	1.66
Atoms	Optimal	Found	Error	Gen	Time
43	-116.04	-110.96	4.38	50	1.26
43	-116.04	-103.36	10.93	50	1.30
43	-116.04	-90.47	22.03	50	1.28
43	-116.04	-68.13	41.29	50	1.30
43	-116.04	-55.14	52.48	50	1.30
43	-116.04	-63.60	45.19	50	1.28
43	-116.04	-115.12	0.80	50	0.70
43	-116.04	-101.44	12.58	50	0.69
43	-116.04	-92.07	20.65	50	0.69
43	-116.04	-113.96	1.79	50	0.78
43	-116.04	-106.50	8.22	50	1.08
43	-116.04	-95.51	17.69	50	1.23
43	-116.04	-69.59	40.03	50	1.11
43	-116.04	-56.20	51.57	50	0.77
43	-116.04	-66.81	42.43	50	0.89
43	-116.04	-116.04	-0.00	50	0.55
43	-116.04	-103.25	11.02	50	1.97
43	-116.04	-95.48	17.72	50	1.55
Atoms	Optimal	Found	Error	Gen	Time
44	-119.32	-112.17	5.99	50	1.38
44	-119.32	-107.89	9.57	50	1.36
44	-119.32	-92.84	22.19	50	1.38
44	-119.32	-68.52	42.58	50	1.39
44	-119.32	-68.51	42.58	50	1.38
44	-119.32	-70.99	40.50	50	1.38
44	-119.32	-118.36	0.80	50	0.75
44	-119.32	-104.39	12.51	50	0.73
44	-119.32	-94.67	20.66	50	0.73
44	-119.32	-116.30	2.53	50	0.67
44	-119.32	-111.34	6.69	50	0.86
44	-119.32	-94.53	20.77	50	2.27
44	-119.32	-70.20	41.16	50	1.58
44	-119.32	-69.39	41.85	50	2.31
44	-119.32	-76.13	36.19	50	0.41
44	-119.32	-119.32	-0.00	50	0.38

44	-119.32	-105.54	11.55	50	2.56
44	-119.32	-98.03	17.84	50	2.19
Atoms	Optimal	Found	Error	Gen	Time
45	-121.56	-107.62	11.47	50	1.50
45	-121.56	-110.90	8.77	50	1.45
45	-121.56	-94.23	22.49	50	1.48
45	-121.56	-71.53	41.16	50	1.45
45	-121.56	1103.55	1007.79	50	1.50
45	-121.56	-71.91	40.85	50	1.52
45	-121.56	-120.57	0.82	50	0.80
45	-121.56	-103.07	15.21	50	0.80
45	-121.56	-94.99	21.86	50	0.78
45	-121.56	-113.87	6.33	50	1.76
45	-121.56	-114.98	5.41	50	1.08
45	-121.56	-97.62	19.69	50	1.95
45	-121.56	-71.88	40.87	50	3.16
45	-121.56	1100.85	1005.57	50	4.64
45	-121.56	-83.65	31.18	50	0.56
45	-121.56	-121.56	-0.00	50	0.58
45	-121.56	-106.81	12.14	50	2.44
45	-121.56	-101.10	16.84	50	2.36
Atoms	Optimal	Found	Error	Gen	Time
46	-124.89	-113.65	9.00	50	1.58
46	-124.89	-107.14	14.21	50	1.59
46	-124.89	-97.10	22.25	50	1.56
46	-124.89	-72.00	42.35	50	1.59
46	-124.89	-67.00	46.35	50	1.59
46	-124.89	-68.88	44.85	50	1.59
46	-124.89	-123.86	0.82	50	0.84
46	-124.89	-105.55	15.48	50	0.84
46	-124.89	-97.35	22.05	50	0.84
46	-124.89	-120.00	3.91	50	1.88
46	-124.89	-114.13	8.61	50	0.77
46	-124.89	-103.91	16.80	50	2.23
46	-124.89	-76.19	39.00	50	1.11
46	-124.89	-68.25	45.35	50	1.56
46	-124.89	-70.47	43.57	50	0.44
46	-124.89	-124.89	-0.00	50	0.62
46	-124.89	-109.41	12.39	50	2.67
46	-124.89	-103.40	17.20	50	2.55
Atoms	Optimal	Found	Error	Gen	Time
47	-128.24	-117.67	8.24	50	1.69
47	-128.24	-112.63	12.17	50	1.70
47	-128.24	-99.57	22.36	50	1.72
47	-128.24	-73.83	42.43	50	1.67

47	-128.24	-72.81	43.23	50	1.69
47	-128.24	-71.61	44.16	50	1.69
47	-128.24	-127.09	0.90	50	0.91
47	-128.24	-113.88	11.19	50	0.91
47	-128.24	-98.94	22.85	50	0.89
47	-128.24	-124.62	2.82	50	1.75
47	-128.24	-117.08	8.71	50	1.12
47	-128.24	-105.82	17.48	50	1.30
47	-128.24	-75.96	40.77	50	2.41
47	-128.24	-77.89	39.26	50	0.81
47	-128.24	-75.42	41.19	50	1.64
47	-128.24	-128.24	-0.00	50	0.61
47	-128.24	-117.11	8.68	50	2.84
47	-128.24	-105.05	18.08	50	2.95
Atoms	Optimal	Found	Error	Gen	Time
48	-131.52	-126.15	4.08	50	1.81
48	-131.52	-118.69	9.75	50	1.81
48	-131.52	-102.10	22.37	50	1.83
48	-131.52	-66.86	49.16	50	1.81
48	-131.52	976.95	842.84	50	1.80
48	-131.52	-83.64	36.40	50	1.78
48	-131.52	-130.28	0.94	50	0.97
48	-131.52	-119.87	8.86	50	0.95
48	-131.52	-112.82	14.21	50	0.95
48	-131.52	-128.90	1.99	50	1.86
48	-131.52	-119.76	8.94	50	3.23
48	-131.52	-111.72	15.05	50	0.81
48	-131.52	-70.39	46.48	50	0.72
48	-131.52	318.55	342.22	50	5.50
48	-131.52	-85.20	35.22	50	3.55
48	-131.52	-131.52	-0.00	50	0.44
48	-131.52	-121.40	7.69	50	2.94
48	-131.52	-115.67	12.05	50	1.88
Atoms	Optimal	Found	Error	Gen	Time
49	-133.76	-123.56	7.62	50	1.92
49	-133.76	-113.49	15.15	50	1.91
49	-133.76	-103.61	22.54	50	1.94
49	-133.76	-73.82	44.81	50	1.91
49	-133.76	-75.64	43.45	50	1.95
49	-133.76	-75.94	43.22	50	1.91
49	-133.76	-132.49	0.95	50	1.02
49	-133.76	-119.14	10.93	50	1.02
49	-133.76	-115.93	13.33	50	1.03
49	-133.76	-129.20	3.41	50	2.56
49	-133.76	-115.42	13.71	50	2.39

49	-133.76	-110.45	17.42	50	0.80
49	-133.76	-74.23	44.51	50	4.30
49	-133.76	-82.56	38.28	50	0.83
49	-133.76	-79.43	40.62	50	2.66
49	-133.76	-133.76	-0.00	50	0.59
49	-133.76	-125.18	6.41	50	0.98
49	-133.76	-119.47	10.68	50	0.83
Atoms	Optimal	Found	Error	Gen	Time
50	-137.08	-123.75	9.73	50	2.02
50	-137.08	-111.83	18.42	50	2.00
50	-137.08	-106.03	22.65	50	2.05
50	-137.08	-86.89	36.61	50	2.08
50	-137.08	-82.20	40.04	50	2.08
50	-137.08	-79.76	41.82	50	2.03
50	-137.08	-135.68	1.02	50	1.09
50	-137.08	-122.16	10.89	50	1.08
50	-137.08	-116.72	14.86	50	1.08
50	-137.08	-132.25	3.52	50	2.38
50	-137.08	-118.19	13.78	50	3.38
50	-137.08	-113.84	16.95	50	2.55
50	-137.08	-92.15	32.78	50	1.84
50	-137.08	-86.65	36.79	50	1.14
50	-137.08	-85.24	37.82	50	2.20
50	-137.08	-137.08	-0.00	50	0.53
50	-137.08	-126.62	7.63	50	1.28
50	-137.08	-120.11	12.38	50	1.34
Atoms	Optimal	Found	Error	Gen	Time
51	-140.44	-127.11	9.49	50	2.17
51	-140.44	-113.99	18.83	50	2.20
51	-140.44	-116.90	16.77	50	2.19
51	-140.44	-75.63	46.15	50	2.17
51	-140.44	-76.85	45.28	50	2.20
51	-140.44	-71.49	49.10	50	2.20
51	-140.44	-138.92	1.08	50	1.17
51	-140.44	-125.27	10.81	50	1.16
51	-140.44	-111.50	20.61	50	1.17
51	-140.44	-137.39	2.17	50	1.64
51	-140.44	-122.08	13.08	50	2.02
51	-140.44	-120.41	14.27	50	2.69
51	-140.44	-79.76	43.21	50	0.59
51	-140.44	-80.81	42.46	50	2.67
51	-140.44	-76.24	45.72	50	0.75
51	-140.44	-140.44	-0.00	50	0.61
51	-140.44	-131.65	6.26	50	0.69
51	-140.44	-114.02	18.82	50	3.94

Atoms	Optimal	Found	Error	Gen	Time
52	-143.72	-134.50	6.42	50	2.34
52	-143.72	-126.40	12.06	50	2.31
52	-143.72	-113.83	20.80	50	2.31
52	-143.72	-79.57	44.64	50	2.30
52	-143.72	-75.62	47.38	50	2.31
52	-143.72	-77.92	45.79	50	2.31
52	-143.72	-142.11	1.12	50	1.23
52	-143.72	-125.15	12.92	50	1.23
52	-143.72	-114.43	20.38	50	1.22
52	-143.72	-140.22	2.43	50	3.03
52	-143.72	-129.81	9.68	50	2.03
52	-143.72	-119.64	16.76	50	2.70
52	-143.72	-85.40	40.58	50	0.72
52	-143.72	-84.71	41.06	50	0.88
52	-143.72	-87.57	39.07	50	5.44
52	-143.72	-143.72	-0.00	50	0.58
52	-143.72	-131.51	8.50	50	2.27
52	-143.72	-116.93	18.64	50	3.34
Atoms	Optimal	Found	Error	Gen	Time
53	-145.96	-127.64	12.55	50	2.48
53	-145.96	-121.97	16.44	50	2.42
53	-145.96	-117.08	19.79	50	2.44
53	-145.96	-83.89	42.53	50	2.45
53	-145.96	-75.96	47.96	50	2.45
53	-145.96	-78.14	46.46	50	2.48
53	-145.96	-144.36	1.10	50	1.34
53	-145.96	-125.14	14.27	50	1.33
53	-145.96	-115.05	21.18	50	1.33
53	-145.96	-133.05	8.85	50	2.27
53	-145.96	-126.08	13.62	50	4.45
53	-145.96	-120.63	17.36	50	2.59
53	-145.96	-86.57	40.69	50	3.34
53	-145.96	-76.83	47.36	50	3.31
53	-145.96	-78.85	45.98	50	5.39
53	-145.96	-145.96	-0.00	50	0.75
53	-145.96	-129.11	11.54	50	2.88
53	-145.96	-117.57	19.45	50	4.30
Atoms	Optimal	Found	Error	Gen	Time
54	-149.30	-135.71	9.10	50	2.67
54	-149.30	-128.40	14.00	50	2.64
54	-149.30	-120.89	19.02	50	2.59
54	-149.30	776.63	620.19	50	2.61
54	-149.30	-85.31	42.86	50	2.62
54	-149.30	-79.75	46.58	50	2.61

54	-149.30	-147.56	1.16	50	1.45
54	-149.30	-129.76	13.09	50	1.42
54	-149.30	-134.81	9.70	50	1.41
54	-149.30	-143.09	4.16	50	2.17
54	-149.30	-132.77	11.07	50	3.56
54	-149.30	-131.45	11.96	50	2.86
54	-149.30	692.55	563.87	50	6.56
54	-149.30	-91.12	38.97	50	0.89
54	-149.30	-85.33	42.85	50	0.73
54	-149.30	-149.30	-0.00	50	0.67
54	-149.30	-134.68	9.79	50	3.59
54	-149.30	-144.00	3.55	50	2.92
Atoms	Optimal	Found	Error	Gen	Time
55	-152.65	-140.55	7.93	50	2.78
55	-152.65	-129.07	15.45	50	2.81
55	-152.65	-121.19	20.61	50	2.77
55	-152.65	-86.87	43.09	50	2.77
55	-152.65	-90.05	41.01	50	2.78
55	-152.65	-76.19	50.09	50	2.77
55	-152.65	-150.85	1.18	50	1.49
55	-152.65	-131.00	14.18	50	1.48
55	-152.65	-137.73	9.78	50	1.49
55	-152.65	-148.35	2.82	50	1.16
55	-152.65	-137.48	9.94	50	2.59
55	-152.65	-127.98	16.16	50	1.75
55	-152.65	-90.51	40.71	50	0.72
55	-152.65	-100.51	34.16	50	1.19
55	-152.65	-79.40	47.99	50	2.66
55	-152.65	-152.65	-0.00	50	0.69
55	-152.65	-136.46	10.61	50	3.48
55	-152.65	-147.22	3.56	50	2.69
Atoms	Optimal	Found	Error	Gen	Time
56	-155.93	-141.06	9.54	50	3.00
56	-155.93	-139.10	10.80	50	2.97
56	-155.93	-121.44	22.12	50	2.89
56	-155.93	-85.17	45.38	50	2.91
56	-155.93	-79.83	48.80	50	2.92
56	-155.93	-83.58	46.40	50	2.91
56	-155.93	-154.07	1.20	50	1.55
56	-155.93	-134.37	13.83	50	1.56
56	-155.93	-138.85	10.96	50	1.58
56	-155.93	-148.34	4.87	50	1.42
56	-155.93	-146.83	5.84	50	0.77
56	-155.93	-130.09	16.57	50	1.47
56	-155.93	-92.76	40.52	50	1.19

56	-155.93	-87.75	43.72	50	0.81
56	-155.93	-85.53	45.15	50	1.09
56	-155.93	-155.93	-0.00	50	0.83
56	-155.93	-139.59	10.48	50	4.70
56	-155.93	-147.77	5.23	50	3.44
Atoms	Optimal	Found	Error	Gen	Time
57	-158.17	-145.56	7.97	50	3.14
57	-158.17	-139.13	12.04	50	3.14
57	-158.17	-121.50	23.18	50	3.12
57	-158.17	-95.93	39.35	50	3.05
57	-158.17	-85.12	46.18	50	3.12
57	-158.17	-81.50	48.47	50	3.08
57	-158.17	-156.31	1.17	50	1.66
57	-158.17	-135.60	14.27	50	1.64
57	-158.17	-135.18	14.53	50	1.59
57	-158.17	-153.70	2.83	50	2.61
57	-158.17	-142.61	9.84	50	3.83
57	-158.17	-128.16	18.97	50	4.53
57	-158.17	-104.25	34.09	50	0.89
57	-158.17	-95.40	39.69	50	1.42
57	-158.17	-82.96	47.55	50	2.70
57	-158.17	-158.17	-0.00	50	1.00
57	-158.17	-143.09	9.54	50	4.09
57	-158.17	-140.71	11.04	50	2.91
Atoms	Optimal	Found	Error	Gen	Time
58	-161.52	-155.02	4.02	50	3.27
58	-161.52	-138.30	14.37	50	3.27
58	-161.52	-134.88	16.50	50	3.27
58	-161.52	-90.95	43.69	50	3.23
58	-161.52	-91.21	43.53	50	3.31
58	-161.52	-87.44	45.87	50	3.33
58	-161.52	-159.57	1.21	50	1.72
58	-161.52	-147.00	8.99	50	1.76
58	-161.52	-137.42	14.92	50	1.74
58	-161.52	-158.81	1.68	50	1.00
58	-161.52	-141.50	12.40	50	6.16
58	-161.52	-144.13	10.77	50	2.91
58	-161.52	-100.73	37.64	50	1.48
58	-161.52	-96.65	40.16	50	1.19
58	-161.52	-90.79	43.79	50	1.50
58	-161.52	-161.52	-0.00	50	0.77
58	-161.52	-149.42	7.49	50	3.75
58	-161.52	-143.21	11.33	50	3.67
Atoms	Optimal	Found	Error	Gen	Time
59	-164.88	-140.21	14.96	50	3.38

59	-164.88	-147.23	10.71	50	3.42
59	-164.88	-135.43	17.86	50	3.39
59	-164.88	-91.24	44.66	50	3.53
59	-164.88	-99.44	39.69	50	3.44
59	-164.88	-84.06	49.02	50	3.47
59	-164.88	-162.88	1.21	50	1.81
59	-164.88	-150.17	8.92	50	1.84
59	-164.88	-138.49	16.00	50	1.81
59	-164.88	-149.44	9.36	50	4.17
59	-164.88	-150.97	8.44	50	3.33
59	-164.88	-143.00	13.27	50	2.94
59	-164.88	-94.99	42.39	50	2.34
59	-164.88	-103.67	37.12	50	1.56
59	-164.88	-89.91	45.47	50	1.01
59	-164.88	-164.88	-0.00	50	0.86
59	-164.88	-152.36	7.60	50	3.80
59	-164.88	-142.79	13.40	50	3.08
Atoms	Optimal	Found	Error	Gen	Time
60	-168.23	-150.58	10.49	50	3.61
60	-168.23	-149.55	11.10	50	3.66
60	-168.23	-140.73	16.35	50	3.67
60	-168.23	-81.21	51.73	50	3.64
60	-168.23	1618.74	1062.23	50	3.67
60	-168.23	-92.88	44.79	50	3.58
60	-168.23	-166.17	1.23	50	1.94
60	-168.23	-153.91	8.51	50	2.00
60	-168.23	-141.09	16.13	50	1.92
60	-168.23	-156.26	7.11	50	5.62
60	-168.23	-153.68	8.65	50	1.62
60	-168.23	-143.11	14.93	50	6.11
60	-168.23	-86.23	48.74	50	4.22
60	-168.23	1618.69	1062.20	50	11.31
60	-168.23	-103.95	38.21	50	2.81
60	-168.23	-168.23	-0.00	50	1.01
60	-168.23	-155.49	7.57	50	2.47
60	-168.23	-147.01	12.61	50	3.03
Atoms	Optimal	Found	Error	Gen	Time
61	-171.50	-156.66	8.65	50	3.88
61	-171.50	-154.76	9.76	50	3.78
61	-171.50	-142.53	16.89	50	3.83
61	-171.50	-98.88	42.34	50	3.86
61	-171.50	-91.26	46.79	50	3.83
61	-171.50	-101.99	40.53	50	3.81
61	-171.50	-169.33	1.26	50	1.98
61	-171.50	-152.97	10.81	50	2.03

61	-171.50	-144.09	15.98	50	2.03
61	-171.50	-165.54	3.48	50	1.41
61	-171.50	-158.27	7.71	50	1.52
61	-171.50	-147.58	13.95	50	3.80
61	-171.50	-107.33	37.42	50	1.03
61	-171.50	-96.21	43.90	50	1.01
61	-171.50	-110.26	35.71	50	0.92
61	-171.50	-171.50	-0.00	50	1.03
61	-171.50	-159.37	7.07	50	1.61
61	-171.50	-150.51	12.24	50	4.03
Atoms	Optimal	Found	Error	Gen	Time
62	-173.74	-164.49	5.33	50	4.01
62	-173.74	-157.91	9.11	50	4.00
62	-173.74	-143.80	17.23	50	4.00
62	-173.74	-91.45	47.36	50	4.02
62	-173.74	-85.95	50.53	50	3.95
62	-173.74	-92.46	46.78	50	4.03
62	-173.74	-171.53	1.27	50	2.14
62	-173.74	-154.01	11.36	50	2.12
62	-173.74	-144.62	16.76	50	2.12
62	-173.74	-171.36	1.37	50	2.70
62	-173.74	-163.83	5.71	50	1.67
62	-173.74	-149.27	14.08	50	2.48
62	-173.74	-96.62	44.39	50	1.03
62	-173.74	-88.00	49.35	50	2.36
62	-173.74	-101.13	41.79	50	1.03
62	-173.74	-173.74	-0.00	50	1.12
62	-173.74	-161.12	7.26	50	1.99
62	-173.74	-150.23	13.53	50	3.56
Atoms	Optimal	Found	Error	Gen	Time
63	-177.05	-151.70	14.32	50	4.20
63	-177.05	-153.84	13.11	50	4.19
63	-177.05	-150.15	15.19	50	4.24
63	-177.05	-104.79	40.81	50	4.20
63	-177.05	-100.76	43.09	50	4.17
63	-177.05	-100.40	43.29	50	4.16
63	-177.05	-174.67	1.35	50	2.22
63	-177.05	-159.13	10.12	50	2.22
63	-177.05	-155.25	12.31	50	2.22
63	-177.05	-160.63	9.27	50	5.92
63	-177.05	-160.76	9.20	50	2.86
63	-177.05	-158.07	10.72	50	5.34
63	-177.05	-113.15	36.09	50	1.84
63	-177.05	-108.09	38.95	50	1.56
63	-177.05	-107.62	39.22	50	1.62

63	-177.05	-177.05	-0.00	50	1.14
63	-177.05	-162.86	8.02	50	5.00
63	-177.05	-162.99	7.94	50	1.16
Atoms	Optimal	Found	Error	Gen	Time
64	-180.41	-151.93	15.79	50	4.45
64	-180.41	-163.08	9.61	50	4.50
64	-180.41	-150.68	16.48	50	4.45
64	-180.41	-108.51	39.86	50	4.39
64	-180.41	-100.47	44.31	50	4.41
64	-180.41	-79.72	55.81	50	4.41
64	-180.41	-177.84	1.43	50	2.34
64	-180.41	-163.53	9.36	50	2.31
64	-180.41	-157.48	12.71	50	2.38
64	-180.41	-157.73	12.57	50	5.50
64	-180.41	-168.86	6.41	50	1.19
64	-180.41	-160.42	11.08	50	2.88
64	-180.41	-119.54	33.74	50	2.97
64	-180.41	-109.51	39.30	50	4.31
64	-180.41	-80.59	55.33	50	7.66
64	-180.41	-180.41	-0.00	50	1.16
64	-180.41	-167.05	7.40	50	4.41
64	-180.41	-165.36	8.35	50	1.42
Atoms	Optimal	Found	Error	Gen	Time
65	-183.70	-162.55	11.51	50	4.66
65	-183.70	-162.23	11.69	50	4.58
65	-183.70	-149.72	18.50	50	4.59
65	-183.70	-108.85	40.74	50	4.49
65	-183.70	-96.33	47.56	50	4.55
65	-183.70	-102.61	44.14	50	4.51
65	-183.70	-181.00	1.47	50	2.52
65	-183.70	-166.64	9.29	50	2.48
65	-183.70	-159.22	13.33	50	2.53
65	-183.70	-174.07	5.24	50	3.73
65	-183.70	-170.98	6.93	50	2.73
65	-183.70	-156.51	14.80	50	5.24
65	-183.70	-113.31	38.32	50	2.06
65	-183.70	-102.96	43.95	50	6.47
65	-183.70	-103.83	43.48	50	1.80
65	-183.70	-183.70	-0.00	50	1.25
65	-183.70	-170.93	6.95	50	3.97
65	-183.70	-166.88	9.16	50	2.14
Atoms	Optimal	Found	Error	Gen	Time
66	-185.93	-157.71	15.18	50	4.94
66	-185.93	-163.39	12.13	50	4.91
66	-185.93	-153.85	17.25	50	4.81

66	-185.93	-102.35	44.95	50	4.73
66	-185.93	-102.45	44.90	50	4.77
66	-185.93	-105.23	43.40	50	4.86
66	-185.93	-183.25	1.44	50	2.56
66	-185.93	-166.48	10.46	50	2.55
66	-185.93	-152.89	17.77	50	2.53
66	-185.93	-162.05	12.84	50	8.39
66	-185.93	-166.79	10.29	50	7.30
66	-185.93	-165.84	10.80	50	3.97
66	-185.93	-107.05	42.42	50	2.34
66	-185.93	-104.18	43.97	50	4.47
66	-185.93	-115.58	37.84	50	4.11
66	-185.93	-185.93	-0.00	50	1.70
66	-185.93	-174.52	6.14	50	2.80
66	-185.93	-155.80	16.21	50	9.19
Atoms	Optimal	Found	Error	Gen	Time
67	-189.26	-169.46	10.46	50	5.17
67	-189.26	-170.56	9.88	50	5.12
67	-189.26	-155.24	17.98	50	5.06
67	-189.26	-101.21	46.52	50	5.06
67	-189.26	-98.97	47.71	50	5.11
67	-189.26	-100.83	46.72	50	5.05
67	-189.26	-186.34	1.54	50	2.69
67	-189.26	-171.06	9.62	50	2.69
67	-189.26	-154.93	18.14	50	2.67
67	-189.26	-173.83	8.15	50	6.89
67	-189.26	-174.43	7.84	50	3.09
67	-189.26	-167.72	11.38	50	3.84
67	-189.26	-104.46	44.81	50	1.81
67	-189.26	-101.60	46.32	50	3.30
67	-189.26	-104.80	44.63	50	2.59
67	-189.26	-189.26	-0.00	50	1.76
67	-189.26	-176.46	6.77	50	3.28
67	-189.26	-158.91	16.04	50	8.81
Atoms	Optimal	Found	Error	Gen	Time
68	-192.63	-168.03	12.77	50	5.25
68	-192.63	-177.17	8.03	50	5.25
68	-192.63	-159.01	17.45	50	5.31
68	-192.63	-104.03	46.00	50	5.28
68	-192.63	-103.72	46.16	50	5.27
68	-192.63	-102.50	46.79	50	5.22
68	-192.63	-189.60	1.57	50	2.77
68	-192.63	-161.39	16.22	50	2.80
68	-192.63	-154.81	19.63	50	2.80
68	-192.63	-177.00	8.12	50	4.69

68	-192.63	-180.78	6.15	50	2.45
68	-192.63	-167.69	12.95	50	5.02
68	-192.63	-107.01	44.45	50	2.19
68	-192.63	-108.78	43.53	50	2.25
68	-192.63	-108.24	43.81	50	2.16
68	-192.63	-192.63	-0.00	50	1.42
68	-192.63	-169.00	12.27	50	4.97
68	-192.63	-158.48	17.73	50	8.59
Atoms	Optimal	Found	Error	Gen	Time
69	-195.99	-169.10	13.72	50	5.50
69	-195.99	-161.78	17.45	50	5.53
69	-195.99	-159.59	18.57	50	5.50
69	-195.99	-106.99	45.41	50	5.50
69	-195.99	-117.28	40.16	50	5.47
69	-195.99	-103.12	47.38	50	5.48
69	-195.99	-192.83	1.61	50	2.92
69	-195.99	-165.39	15.61	50	2.89
69	-195.99	-178.90	8.72	50	2.95
69	-195.99	-181.26	7.51	50	6.94
69	-195.99	-169.15	13.69	50	4.03
69	-195.99	-168.35	14.10	50	2.17
69	-195.99	-116.32	40.65	50	1.83
69	-195.99	-121.52	37.99	50	2.48
69	-195.99	-107.11	45.35	50	2.09
69	-195.99	-195.99	-0.00	50	1.94
69	-195.99	-178.92	8.71	50	3.09
69	-195.99	-185.82	5.19	50	3.52
Atoms	Optimal	Found	Error	Gen	Time
70	-199.27	-187.83	5.74	50	5.75
70	-199.27	-178.26	10.54	50	5.78
70	-199.27	-160.92	19.25	50	5.81
70	-199.27	-112.89	43.35	50	5.70
70	-199.27	-100.93	49.35	50	5.67
70	-199.27	-104.21	47.71	50	5.75
70	-199.27	-196.01	1.64	50	3.05
70	-199.27	-167.95	15.72	50	3.05
70	-199.27	-181.59	8.88	50	3.08
70	-199.27	-194.40	2.45	50	2.22
70	-199.27	-184.01	7.66	50	4.02
70	-199.27	-171.88	13.75	50	4.83
70	-199.27	-121.71	38.92	50	2.83
70	-199.27	-107.53	46.04	50	1.88
70	-199.27	-106.62	46.49	50	6.36
70	-199.27	-199.27	-0.00	50	1.34
70	-199.27	-172.51	13.43	50	6.16

70	-199.27	-189.01	5.15	50	2.39
Atoms	Optimal	Found	Error	Gen	Time
71	-201.53	-177.72	11.81	50	6.01
71	-201.53	-179.75	10.81	50	6.02
71	-201.53	-161.01	20.11	50	6.03
71	-201.53	-112.82	44.02	50	6.00
71	-201.53	-87.06	56.80	50	6.02
71	-201.53	-114.71	43.08	50	6.00
71	-201.53	-198.25	1.63	50	3.19
71	-201.53	-169.34	15.97	50	3.19
71	-201.53	-183.85	8.77	50	3.19
71	-201.53	-188.36	6.54	50	4.61
71	-201.53	-188.10	6.67	50	2.44
71	-201.53	-166.59	17.34	50	5.47
71	-201.53	-119.29	40.81	50	2.55
71	-201.53	-90.72	54.98	50	9.58
71	-201.53	-121.39	39.77	50	1.66
71	-201.53	-201.53	-0.00	50	1.42
71	-201.53	-174.47	13.43	50	8.30
71	-201.53	-190.59	5.43	50	2.84
Atoms	Optimal	Found	Error	Gen	Time
72	-204.85	-180.84	11.72	50	6.28
72	-204.85	-185.04	9.67	50	6.25
72	-204.85	-162.64	20.61	50	6.28
72	-204.85	-116.58	43.09	50	6.31
72	-204.85	4595.42	2343.35	50	6.33
72	-204.85	-109.03	46.78	50	6.20
72	-204.85	-201.41	1.67	50	3.33
72	-204.85	-171.35	16.35	50	3.31
72	-204.85	-173.19	15.46	50	3.33
72	-204.85	-195.63	4.50	50	2.11
72	-204.85	-189.86	7.31	50	5.53
72	-204.85	-170.85	16.60	50	6.50
72	-204.85	-126.30	38.34	50	1.62
72	-204.85	2245.86	1196.37	50	17.28
72	-204.85	-118.64	42.08	50	4.16
72	-204.85	-204.85	-0.00	50	1.98
72	-204.85	-177.90	13.16	50	5.64
72	-204.85	-180.23	12.02	50	5.70
Atoms	Optimal	Found	Error	Gen	Time
73	-208.23	-173.45	16.70	50	6.53
73	-208.23	-187.36	10.02	50	6.55
73	-208.23	-164.95	20.78	50	6.55
73	-208.23	-119.56	42.58	50	6.48
73	-208.23	-114.94	44.80	50	6.47

73	-208.23	-113.31	45.58	50	6.51
73	-208.23	-204.68	1.70	50	3.47
73	-208.23	-175.94	15.51	50	3.47
73	-208.23	-175.96	15.50	50	3.53
73	-208.23	-181.02	13.07	50	9.64
73	-208.23	-191.00	8.27	50	5.59
73	-208.23	-174.17	16.36	50	4.45
73	-208.23	-130.41	37.37	50	1.77
73	-208.23	-125.50	39.73	50	1.88
73	-208.23	-118.67	43.01	50	1.67
73	-208.23	-208.23	-0.00	50	1.77
73	-208.23	-181.30	12.93	50	9.19
73	-208.23	-181.49	12.84	50	6.86
Atoms	Optimal	Found	Error	Gen	Time
74	-211.58	-203.33	3.90	50	6.88
74	-211.58	-191.00	9.73	50	6.81
74	-211.58	-168.37	20.42	50	6.91
74	-211.58	-121.07	42.78	50	6.84
74	-211.58	-112.53	46.82	50	6.88
74	-211.58	-110.98	47.55	50	6.75
74	-211.58	-207.95	1.72	50	3.61
74	-211.58	-176.30	16.67	50	3.61
74	-211.58	-176.00	16.82	50	3.58
74	-211.58	-208.10	1.64	50	1.77
74	-211.58	-196.30	7.22	50	2.86
74	-211.58	-175.97	16.83	50	3.47
74	-211.58	-131.04	38.07	50	1.86
74	-211.58	-119.14	43.69	50	2.39
74	-211.58	-115.68	45.33	50	2.05
74	-211.58	-211.58	-0.00	50	1.66
74	-211.58	-181.67	14.14	50	9.78
74	-211.58	-181.41	14.26	50	5.67
Atoms	Optimal	Found	Error	Gen	Time
75	-214.84	-195.46	9.02	50	7.09
75	-214.84	-182.63	14.99	50	7.14
75	-214.84	-173.90	19.05	50	7.09
75	-214.84	-113.39	47.22	50	7.11
75	-214.84	-122.30	43.07	50	7.09
75	-214.84	-114.85	46.54	50	7.11
75	-214.84	-211.13	1.73	50	3.80
75	-214.84	-178.47	16.93	50	3.77
75	-214.84	-177.41	17.42	50	3.75
75	-214.84	-202.35	5.81	50	4.69
75	-214.84	-195.85	8.84	50	3.19
75	-214.84	-186.69	13.10	50	2.39

75	-214.84	-120.41	43.95	50	3.17
75	-214.84	-128.79	40.05	50	1.91
75	-214.84	-119.82	44.23	50	5.92
75	-214.84	-214.84	-0.00	50	1.80
75	-214.84	-184.20	14.26	50	11.30
75	-214.84	-180.34	16.05	50	11.56
Atoms	Optimal	Found	Error	Gen	Time
76	-217.09	-187.31	13.72	50	7.38
76	-217.09	-191.55	11.76	50	7.41
76	-217.09	-176.98	18.48	50	7.41
76	-217.09	-112.37	48.24	50	7.27
76	-217.09	-113.56	47.69	50	7.52
76	-217.09	-109.91	49.37	50	7.50
76	-217.09	-213.36	1.72	50	3.94
76	-217.09	-184.39	15.06	50	3.98
76	-217.09	-180.02	17.08	50	4.00
76	-217.09	-199.14	8.27	50	6.66
76	-217.09	-199.08	8.30	50	5.28
76	-217.09	-190.51	12.24	50	2.70
76	-217.09	-116.74	46.23	50	3.12
76	-217.09	-129.45	40.37	50	2.38
76	-217.09	-119.91	44.77	50	1.92
76	-217.09	-217.09	-0.00	50	1.78
76	-217.09	-189.08	12.90	50	5.70
76	-217.09	-183.18	15.62	50	11.61
Atoms	Optimal	Found	Error	Gen	Time
77	-220.41	-196.16	11.00	50	7.78
77	-220.41	-183.01	16.97	50	7.73
77	-220.41	-171.33	22.27	50	7.80
77	-220.41	-112.01	49.18	50	7.64
77	-220.41	-105.04	52.34	50	7.62
77	-220.41	-111.95	49.21	50	7.61
77	-220.41	-216.49	1.78	50	4.11
77	-220.41	-184.92	16.10	50	4.12
77	-220.41	-181.35	17.72	50	4.05
77	-220.41	-212.36	3.65	50	2.45
77	-220.41	-190.13	13.74	50	10.12
77	-220.41	-186.46	15.40	50	9.69
77	-220.41	-115.68	47.51	50	4.64
77	-220.41	-109.52	50.31	50	2.16
77	-220.41	-118.41	46.28	50	3.88
77	-220.41	-220.41	-0.00	50	1.83
77	-220.41	-189.82	13.88	50	13.52
77	-220.41	-184.47	16.31	50	10.48
Atoms	Optimal	Found	Error	Gen	Time

78	-223.76	-195.20	12.76	50	8.05
78	-223.76	-198.77	11.17	50	8.00
78	-223.76	-179.14	19.94	50	8.09
78	-223.76	117.99	152.73	50	7.92
78	-223.76	-121.33	45.78	50	7.99
78	-223.76	-104.87	53.13	50	7.98
78	-223.76	-219.62	1.85	50	4.20
78	-223.76	-187.66	16.13	50	4.24
78	-223.76	-197.39	11.78	50	4.20
78	-223.76	-201.03	10.16	50	2.53
78	-223.76	-208.26	6.93	50	2.97
78	-223.76	-191.31	14.50	50	6.51
78	-223.76	65.89	129.45	50	11.05
78	-223.76	-128.87	42.41	50	2.06
78	-223.76	-107.90	51.78	50	2.00
78	-223.76	-223.76	-0.00	50	2.00
78	-223.76	-191.76	14.30	50	11.89
78	-223.76	-203.66	8.98	50	5.20
Atoms	Optimal	Found	Error	Gen	Time
79	-226.94	-197.93	12.78	50	8.44
79	-226.94	-189.32	16.57	50	8.28
79	-226.94	-188.15	17.09	50	8.36
79	-226.94	-125.34	44.77	50	8.27
79	-226.94	-122.33	46.10	50	8.41
79	-226.94	-122.85	45.87	50	8.25
79	-226.94	-222.55	1.93	50	4.44
79	-226.94	-189.23	16.62	50	4.47
79	-226.94	-199.72	11.99	50	4.48
79	-226.94	-212.75	6.25	50	4.81
79	-226.94	-193.80	14.60	50	10.75
79	-226.94	-200.67	11.57	50	6.41
79	-226.94	-138.10	39.15	50	2.22
79	-226.94	-129.63	42.88	50	2.09
79	-226.94	-129.68	42.86	50	4.36
79	-226.94	-226.94	-0.00	50	2.14
79	-226.94	-193.54	14.72	50	10.36
79	-226.94	-206.02	9.22	50	3.52
Atoms	Optimal	Found	Error	Gen	Time
80	-230.41	-205.09	10.99	50	8.70
80	-230.41	-208.24	9.62	50	8.69
80	-230.41	-185.01	19.71	50	8.67
80	-230.41	-115.53	49.86	50	8.67
80	-230.41	481.14	308.82	50	8.66
80	-230.41	-117.26	49.11	50	8.56
80	-230.41	-225.88	1.97	50	4.56

80	-230.41	-193.26	16.12	50	4.58
80	-230.41	-200.46	13.00	50	4.58
80	-230.41	-222.57	3.41	50	5.70
80	-230.41	-214.47	6.92	50	2.69
80	-230.41	-196.97	14.52	50	2.42
80	-230.41	-118.25	48.68	50	14.81
80	-230.41	261.01	213.28	50	5.00
80	-230.41	-126.84	44.95	50	2.36
80	-230.41	-230.41	-0.00	50	2.77
80	-230.41	-197.39	14.33	50	11.45
80	-230.41	-208.91	9.33	50	3.12
Atoms	Optimal	Found	Error	Gen	Time
81	-232.66	-204.38	12.15	50	9.05
81	-232.66	-213.09	8.41	50	9.19
81	-232.66	-180.94	22.23	50	9.02
81	-232.66	-118.75	48.96	50	8.95
81	-232.66	-108.94	53.17	50	8.88
81	-232.66	-129.04	44.54	50	8.95
81	-232.66	-228.13	1.95	50	4.72
81	-232.66	-194.48	16.41	50	4.72
81	-232.66	-197.98	14.91	50	4.66
81	-232.66	-215.39	7.42	50	7.14
81	-232.66	-216.51	6.94	50	6.55
81	-232.66	-194.39	16.45	50	4.83
81	-232.66	-128.48	44.78	50	3.02
81	-232.66	-111.41	52.11	50	9.12
81	-232.66	-136.71	41.24	50	4.23
81	-232.66	-232.66	-0.00	50	2.27
81	-232.66	-200.88	13.66	50	8.70
81	-232.66	-205.05	11.86	50	10.67
Atoms	Optimal	Found	Error	Gen	Time
82	-235.99	-206.13	12.66	50	9.36
82	-235.99	-198.88	15.73	50	9.33
82	-235.99	-189.39	19.75	50	9.38
82	-235.99	-121.41	48.56	50	9.30
82	-235.99	-117.67	50.14	50	9.30
82	-235.99	-126.75	46.29	50	9.25
82	-235.99	-231.25	2.01	50	4.86
82	-235.99	-196.41	16.77	50	4.97
82	-235.99	-201.21	14.74	50	4.94
82	-235.99	-221.33	6.21	50	3.33
82	-235.99	-204.76	13.24	50	11.14
82	-235.99	-202.67	14.12	50	2.23
82	-235.99	-131.73	44.18	50	3.11
82	-235.99	-124.53	47.23	50	4.09

82	-235.99	-126.53	46.38	50	29.70
82	-235.99	-235.99	-0.00	50	3.02
82	-235.99	-201.91	14.44	50	12.27
82	-235.99	-208.17	11.79	50	12.11
Atoms	Optimal	Found	Error	Gen	Time
83	-239.35	-207.39	13.35	50	9.61
83	-239.35	-211.63	11.58	50	9.66
83	-239.35	-185.14	22.65	50	9.69
83	-239.35	-126.44	47.18	50	9.61
83	-239.35	-122.99	48.62	50	9.62
83	-239.35	-140.80	41.17	50	9.59
83	-239.35	-234.52	2.02	50	5.03
83	-239.35	-196.76	17.79	50	5.06
83	-239.35	-203.38	15.03	50	5.05
83	-239.35	-223.74	6.52	50	3.31
83	-239.35	-220.92	7.70	50	5.74
83	-239.35	-191.26	20.09	50	11.34
83	-239.35	-136.33	43.04	50	2.47
83	-239.35	-136.40	43.01	50	2.69
83	-239.35	-156.45	34.64	50	2.33
83	-239.35	-239.35	-0.00	50	2.38
83	-239.35	-203.17	15.12	50	14.97
83	-239.35	-210.42	12.09	50	10.92
Atoms	Optimal	Found	Error	Gen	Time
84	-242.71	-216.37	10.85	50	10.06
84	-242.71	-208.19	14.22	50	9.98
84	-242.71	-191.66	21.03	50	10.02
84	-242.71	-128.74	46.96	50	9.97
84	-242.71	-121.16	50.08	50	10.02
84	-242.71	-136.03	43.96	50	9.95
84	-242.71	-237.77	2.04	50	5.25
84	-242.71	-199.17	17.94	50	5.27
84	-242.71	-209.75	13.58	50	5.28
84	-242.71	-221.86	8.59	50	7.75
84	-242.71	-216.23	10.91	50	11.17
84	-242.71	-201.42	17.01	50	5.00
84	-242.71	-132.65	45.35	50	6.98
84	-242.71	-126.79	47.76	50	4.22
84	-242.71	-147.99	39.03	50	2.34
84	-242.71	-242.71	-0.00	50	2.50
84	-242.71	-205.68	15.26	50	12.28
84	-242.71	-213.50	12.04	50	9.62
Atoms	Optimal	Found	Error	Gen	Time
85	-245.98	-230.33	6.36	50	10.47
85	-245.98	-220.26	10.46	50	10.47

85	-245.98	-203.99	17.07	50	10.65
85	-245.98	-113.81	53.73	50	10.55
85	-245.98	-119.71	51.33	50	10.33
85	-245.98	-120.58	50.98	50	10.38
85	-245.98	-240.96	2.04	50	5.48
85	-245.98	-197.15	19.85	50	5.50
85	-245.98	-210.39	14.47	50	5.47
85	-245.98	-240.29	2.31	50	4.44
85	-245.98	-225.04	8.52	50	7.88
85	-245.98	-214.23	12.91	50	4.30
85	-245.98	-127.98	47.97	50	3.41
85	-245.98	-126.50	48.57	50	7.36
85	-245.98	-128.90	47.60	50	2.52
85	-245.98	-245.98	-0.00	50	2.45
85	-245.98	-210.28	14.52	50	7.27
85	-245.98	-215.30	12.48	50	7.80
Atoms	Optimal	Found	Error	Gen	Time
86	-248.24	-216.91	12.62	50	10.95
86	-248.24	-214.48	13.60	50	11.05
86	-248.24	-188.35	24.13	50	10.81
86	-248.24	-125.52	49.43	50	10.73
86	-248.24	-114.43	53.90	50	10.69
86	-248.24	-131.23	47.14	50	10.69
86	-248.24	-243.20	2.03	50	5.72
86	-248.24	-228.48	7.96	50	5.66
86	-248.24	-210.03	15.39	50	5.70
86	-248.24	-234.84	5.40	50	4.75
86	-248.24	-220.69	11.10	50	5.91
86	-248.24	-199.03	19.82	50	9.30
86	-248.24	-142.42	42.63	50	8.41
86	-248.24	-118.00	52.47	50	9.59
86	-248.24	-136.04	45.20	50	3.50
86	-248.24	-248.24	-0.00	50	2.59
86	-248.24	-236.08	4.90	50	2.89
86	-248.24	-213.99	13.80	50	9.70
Atoms	Optimal	Found	Error	Gen	Time
87	-251.57	-221.75	11.86	50	11.00
87	-251.57	-229.27	8.86	50	11.08
87	-251.57	-207.85	17.38	50	11.12
87	-251.57	-109.64	56.42	50	11.14
87	-251.57	-131.32	47.80	50	11.11
87	-251.57	-131.55	47.71	50	11.03
87	-251.57	-246.41	2.05	50	5.86
87	-251.57	-212.28	15.62	50	5.89
87	-251.57	-208.08	17.29	50	5.94

87	-251.57	-241.07	4.17	50	3.16
87	-251.57	-234.23	6.89	50	6.76
87	-251.57	-216.55	13.92	50	6.39
87	-251.57	-110.21	56.19	50	4.25
87	-251.57	-145.99	41.97	50	2.69
87	-251.57	-140.65	44.09	50	2.97
87	-251.57	-251.57	-0.00	50	2.67
87	-251.57	-221.15	12.09	50	15.31
87	-251.57	-220.23	12.46	50	5.45
Atoms	Optimal	Found	Error	Gen	Time
88	-254.94	-212.87	16.50	50	11.47
88	-254.94	-209.45	17.85	50	11.45
88	-254.94	-201.19	21.08	50	11.44
88	-254.94	-127.85	49.85	50	11.34
88	-254.94	-131.02	48.61	50	11.44
88	-254.94	-129.34	49.27	50	11.34
88	-254.94	-249.70	2.06	50	6.00
88	-254.94	-221.31	13.19	50	6.06
88	-254.94	-210.71	17.35	50	6.09
88	-254.94	-228.92	10.21	50	13.00
88	-254.94	-219.36	13.96	50	15.16
88	-254.94	-209.58	17.79	50	3.81
88	-254.94	-140.73	44.80	50	2.81
88	-254.94	-138.03	45.86	50	4.39
88	-254.94	-135.96	46.67	50	2.94
88	-254.94	-254.94	-0.00	50	2.72
88	-254.94	-228.77	10.27	50	10.89
88	-254.94	-222.71	12.64	50	4.50
Atoms	Optimal	Found	Error	Gen	Time
89	-258.30	-212.90	17.58	50	11.92
89	-258.30	-222.38	13.91	50	11.86
89	-258.30	-197.11	23.69	50	11.91
89	-258.30	-134.97	47.75	50	11.73
89	-258.30	-140.27	45.69	50	11.90
89	-258.30	-122.92	52.41	50	11.91
89	-258.30	-252.98	2.06	50	6.31
89	-258.30	-223.36	13.53	50	6.25
89	-258.30	-213.93	17.18	50	6.28
89	-258.30	-225.87	12.56	50	9.38
89	-258.30	-236.05	8.61	50	3.83
89	-258.30	-208.98	19.09	50	4.22
89	-258.30	-149.79	42.01	50	3.28
89	-258.30	-151.25	41.45	50	3.23
89	-258.30	-128.65	50.19	50	3.78
89	-258.30	-258.30	-0.00	50	2.97

89	-258.30	-231.11	10.52	50	11.45
89	-258.30	-226.79	12.20	50	3.48
Atoms	Optimal	Found	Error	Gen	Time
90	-261.67	-239.37	8.52	50	12.30
90	-261.67	-218.00	16.69	50	12.30
90	-261.67	-200.71	23.30	50	12.31
90	-261.67	-136.40	47.87	50	12.19
90	-261.67	2046.81	882.22	50	12.36
90	-261.67	-133.51	48.98	50	12.23
90	-261.67	-256.21	2.08	50	6.58
90	-261.67	-242.65	7.27	50	6.62
90	-261.67	-210.75	19.46	50	6.49
90	-261.67	-254.00	2.93	50	4.06
90	-261.67	-226.75	13.35	50	9.69
90	-261.67	-216.67	17.20	50	3.89
90	-261.67	-143.11	45.31	50	4.42
90	-261.67	249.03	195.17	50	7.83
90	-261.67	-143.76	45.06	50	4.44
90	-261.67	-261.67	-0.00	50	3.00
90	-261.67	-249.39	4.69	50	3.09
90	-261.67	-218.73	16.41	50	12.17
Atoms	Optimal	Found	Error	Gen	Time
91	-264.93	-214.16	19.16	50	12.83
91	-264.93	-214.43	19.06	50	12.92
91	-264.93	-211.14	20.31	50	13.02
91	-264.93	-141.98	46.41	50	12.78
91	-264.93	-147.63	44.27	50	12.69
91	-264.93	-129.25	51.21	50	12.75
91	-264.93	-259.33	2.11	50	6.74
91	-264.93	-244.21	7.82	50	6.80
91	-264.93	-211.60	20.13	50	6.76
91	-264.93	-227.30	14.21	50	13.69
91	-264.93	-231.23	12.72	50	4.22
91	-264.93	-225.33	14.95	50	4.53
91	-264.93	-151.59	42.78	50	3.27
91	-264.93	-158.06	40.34	50	4.27
91	-264.93	-140.40	47.01	50	3.27
91	-264.93	-264.93	-0.00	50	3.03
91	-264.93	-251.38	5.12	50	4.34
91	-264.93	-222.08	16.18	50	11.12
Atoms	Optimal	Found	Error	Gen	Time
92	-267.17	-241.55	9.59	50	13.31
92	-267.17	-239.64	10.30	50	13.12
92	-267.17	-204.92	23.30	50	13.08
92	-267.17	-135.37	49.33	50	13.00

92	-267.17	-144.69	45.84	50	13.02
92	-267.17	-160.02	40.11	50	13.03
92	-267.17	-261.53	2.11	50	6.91
92	-267.17	-247.34	7.42	50	6.94
92	-267.17	-211.94	20.67	50	6.92
92	-267.17	-252.16	5.62	50	4.31
92	-267.17	-251.92	5.71	50	3.67
92	-267.17	-220.78	17.36	50	3.47
92	-267.17	-138.67	48.10	50	13.20
92	-267.17	-152.86	42.79	50	3.38
92	-267.17	-171.13	35.95	50	3.33
92	-267.17	-267.17	-0.00	50	3.19
92	-267.17	-251.60	5.83	50	5.11
92	-267.17	-222.01	16.90	50	5.92
Atoms	Optimal	Found	Error	Gen	Time
93	-270.49	-241.58	10.69	50	13.61
93	-270.49	-225.14	16.76	50	13.69
93	-270.49	-224.81	16.89	50	13.53
93	-270.49	-134.16	50.40	50	13.45
93	-270.49	-133.41	50.68	50	13.52
93	-270.49	-145.51	46.21	50	13.39
93	-270.49	-264.61	2.17	50	7.17
93	-270.49	-250.01	7.57	50	7.17
93	-270.49	-227.19	16.01	50	7.08
93	-270.49	-257.70	4.73	50	4.42
93	-270.49	-232.26	14.13	50	12.92
93	-270.49	-235.89	12.79	50	7.52
93	-270.49	-138.75	48.70	50	5.08
93	-270.49	-138.48	48.80	50	3.56
93	-270.49	-164.00	39.37	50	3.28
93	-270.49	-270.49	-0.00	50	3.41
93	-270.49	-255.15	5.67	50	4.20
93	-270.49	-231.38	14.46	50	6.59
Atoms	Optimal	Found	Error	Gen	Time
94	-273.84	-248.39	9.29	50	14.08
94	-273.84	-250.27	8.61	50	14.11
94	-273.84	-227.69	16.85	50	14.09
94	-273.84	-144.58	47.20	50	13.83
94	-273.84	-146.26	46.59	50	14.00
94	-273.84	-146.75	46.41	50	13.95
94	-273.84	-267.67	2.25	50	7.45
94	-273.84	-251.75	8.07	50	7.42
94	-273.84	-229.79	16.09	50	7.41
94	-273.84	-266.58	2.65	50	3.36
94	-273.84	-258.12	5.74	50	3.73

94	-273.84	-236.55	13.62	50	5.67
94	-273.84	-157.70	42.41	50	3.78
94	-273.84	-157.17	42.61	50	3.59
94	-273.84	-158.81	42.01	50	4.08
94	-273.84	-273.84	-0.00	50	3.23
94	-273.84	-258.59	5.57	50	3.70
94	-273.84	-234.58	14.34	50	6.48
Atoms	Optimal	Found	Error	Gen	Time
95	-277.23	-231.40	16.53	50	14.45
95	-277.23	-244.41	11.84	50	14.47
95	-277.23	-209.75	24.34	50	14.52
95	-277.23	-135.64	51.07	50	14.44
95	-277.23	-160.47	42.12	50	14.48
95	-277.23	-129.04	53.46	50	14.47
95	-277.23	-270.80	2.32	50	7.61
95	-277.23	-257.86	6.99	50	7.70
95	-277.23	-233.71	15.70	50	7.64
95	-277.23	-238.70	13.90	50	12.39
95	-277.23	-251.10	9.42	50	13.11
95	-277.23	-221.47	20.11	50	12.03
95	-277.23	-144.33	47.94	50	16.20
95	-277.23	-165.84	40.18	50	4.20
95	-277.23	-138.95	49.88	50	3.77
95	-277.23	-277.23	-0.00	50	3.47
95	-277.23	-264.72	4.51	50	4.00
95	-277.23	-237.23	14.43	50	12.14
Atoms	Optimal	Found	Error	Gen	Time
96	-280.50	-240.34	14.32	50	15.16
96	-280.50	-236.50	15.69	50	15.02
96	-280.50	-222.58	20.65	50	15.05
96	-280.50	-141.05	49.71	50	14.83
96	-280.50	-138.55	50.61	50	15.06
96	-280.50	-129.95	53.67	50	14.88
96	-280.50	-273.91	2.35	50	7.91
96	-280.50	-258.28	7.92	50	7.91
96	-280.50	-246.42	12.15	50	7.98
96	-280.50	-256.04	8.72	50	7.66
96	-280.50	-244.87	12.70	50	14.33
96	-280.50	-239.63	14.57	50	5.75
96	-280.50	-146.79	47.67	50	7.78
96	-280.50	-149.34	46.76	50	5.83
96	-280.50	-141.82	49.44	50	3.97
96	-280.50	-280.50	-0.00	50	3.89
96	-280.50	-266.05	5.15	50	3.88
96	-280.50	-259.76	7.39	50	4.20

Atoms	Optimal	Found	Error	Gen	Time
97	-282.75	-253.62	10.30	50	15.38
97	-282.75	-262.38	7.20	50	15.52
97	-282.75	-228.90	19.04	50	15.53
97	-282.75	-151.09	46.56	50	15.25
97	-282.75	-142.09	49.75	50	15.33
97	-282.75	-151.53	46.41	50	15.42
97	-282.75	-276.16	2.33	50	8.19
97	-282.75	-261.39	7.55	50	8.14
97	-282.75	-249.29	11.84	50	8.19
97	-282.75	-270.32	4.40	50	4.91
97	-282.75	-268.77	4.94	50	4.78
97	-282.75	-243.01	14.06	50	5.09
97	-282.75	-155.04	45.17	50	4.61
97	-282.75	-147.86	47.71	50	5.09
97	-282.75	-163.46	42.19	50	3.91
97	-282.75	-282.75	-0.00	50	3.88
97	-282.75	-268.76	4.95	50	4.62
97	-282.75	-261.96	7.35	50	4.45
Atoms	Optimal	Found	Error	Gen	Time
98	-286.08	-233.96	18.22	50	16.16
98	-286.08	-246.25	13.92	50	16.17
98	-286.08	-224.39	21.57	50	16.00
98	-286.08	-144.21	49.59	50	15.86
98	-286.08	-163.45	42.87	50	15.86
98	-286.08	-138.38	51.63	50	15.89
98	-286.08	-279.10	2.44	50	8.41
98	-286.08	-254.57	11.02	50	8.41
98	-286.08	-252.09	11.88	50	8.30
98	-286.08	-248.26	13.22	50	18.83
98	-286.08	-253.76	11.30	50	12.66
98	-286.08	-249.18	12.90	50	4.03
98	-286.08	-155.52	45.64	50	3.91
98	-286.08	-170.18	40.51	50	4.61
98	-286.08	-153.84	46.22	50	4.42
98	-286.08	-286.08	-0.00	50	4.00
98	-286.08	-267.07	6.65	50	5.16
98	-286.08	-265.02	7.36	50	4.27
Atoms	Optimal	Found	Error	Gen	Time
99	-289.45	-268.89	7.10	50	16.58
99	-289.45	-242.63	16.18	50	16.47
99	-289.45	-222.96	22.97	50	16.48
99	-289.45	24506.51	8566.54	50	16.36
99	-289.45	-143.74	50.34	50	16.19
99	-289.45	-145.43	49.76	50	16.14

99	-289.45	-282.31	2.47	50	8.64
99	-289.45	-258.29	10.77	50	8.62
99	-289.45	-245.84	15.07	50	8.52
99	-289.45	-280.13	3.22	50	4.83
99	-289.45	-259.43	10.37	50	7.72
99	-289.45	-244.86	15.41	50	4.28
99	-289.45	24487.94	8560.12	50	51.62
99	-289.45	-153.75	46.88	50	3.80
99	-289.45	-156.91	45.79	50	5.00
99	-289.45	-289.45	-0.00	50	3.92
99	-289.45	-270.47	6.56	50	5.30
99	-289.45	-258.39	10.73	50	6.88
Atoms	Optimal	Found	Error	Gen	Time
100	-292.81	-242.24	17.27	50	16.91
100	-292.81	-242.06	17.33	50	16.88
100	-292.81	-239.83	18.09	50	16.94
100	-292.81	-156.43	46.58	50	16.69
100	-292.81	-143.79	50.89	50	17.06
100	-292.81	-143.53	50.98	50	16.75
100	-292.81	-285.52	2.49	50	8.84
100	-292.81	-259.86	11.25	50	8.86
100	-292.81	-248.82	15.02	50	8.78
100	-292.81	-254.59	13.05	50	14.59
100	-292.81	-252.00	13.94	50	9.56
100	-292.81	-259.29	11.45	50	4.28
100	-292.81	-164.08	43.96	50	4.23
100	-292.81	-163.52	44.15	50	4.27
100	-292.81	-154.78	47.14	50	4.38
100	-292.81	-292.81	-0.00	50	3.97
100	-292.81	-275.82	5.80	50	5.05
100	-292.81	-263.20	10.11	50	5.06
Atoms	Optimal	Found	Error	Gen	Time
101	-296.17	-266.62	9.98	50	17.59
101	-296.17	-250.44	15.44	50	17.61
101	-296.17	-234.82	20.71	50	17.67
101	-296.17	-160.66	45.75	50	17.55
101	-296.17	-154.08	47.98	50	17.44
101	-296.17	-153.54	48.16	50	17.69
101	-296.17	-288.67	2.53	50	9.30
101	-296.17	-261.57	11.68	50	9.28
101	-296.17	-250.88	15.29	50	9.22
101	-296.17	-285.84	3.49	50	4.49
101	-296.17	-261.00	11.87	50	16.33
101	-296.17	-251.97	14.92	50	4.62
101	-296.17	-163.99	44.63	50	4.08

101	-296.17	-159.97	45.99	50	4.86
101	-296.17	-162.79	45.04	50	5.81
101	-296.17	-296.17	-0.00	50	4.34
101	-296.17	-278.00	6.13	50	4.47
101	-296.17	-263.33	11.09	50	6.69
Atoms	Optimal	Found	Error	Gen	Time
102	-299.45	-250.88	16.22	50	18.16
102	-299.45	-254.41	15.04	50	18.17
102	-299.45	-239.56	20.00	50	18.22
102	-299.45	-152.03	49.23	50	17.83
102	-299.45	-145.50	51.41	50	17.86
102	-299.45	2072.67	792.16	50	17.77
102	-299.45	-291.81	2.55	50	9.39
102	-299.45	-272.01	9.16	50	9.44
102	-299.45	-245.00	18.18	50	9.44
102	-299.45	-269.21	10.10	50	19.91
102	-299.45	-261.91	12.54	50	16.83
102	-299.45	-252.65	15.63	50	4.50
102	-299.45	-164.24	45.15	50	6.48
102	-299.45	-152.28	49.15	50	5.36
102	-299.45	1559.36	620.74	50	45.83
102	-299.45	-299.45	-0.00	50	4.28
102	-299.45	-282.40	5.69	50	4.83
102	-299.45	-251.16	16.13	50	6.97
Atoms	Optimal	Found	Error	Gen	Time
103	-301.70	-258.59	14.29	50	18.62
103	-301.70	-264.56	12.31	50	18.50
103	-301.70	-231.80	23.17	50	18.56
103	-301.70	-144.23	52.19	50	18.25
103	-301.70	-152.61	49.42	50	18.27
103	-301.70	-153.98	48.96	50	18.30
103	-301.70	-294.06	2.53	50	9.70
103	-301.70	-267.52	11.33	50	9.69
103	-301.70	-247.14	18.08	50	9.69
103	-301.70	-283.30	6.10	50	4.84
103	-301.70	-280.67	6.97	50	4.99
103	-301.70	-252.38	16.35	50	10.02
103	-301.70	-156.16	48.24	50	5.06
103	-301.70	-166.57	44.79	50	4.28
103	-301.70	-174.27	42.24	50	4.81
103	-301.70	-301.70	-0.00	50	4.31
103	-301.70	-282.79	6.27	50	4.69
103	-301.70	-253.46	15.99	50	6.27
Atoms	Optimal	Found	Error	Gen	Time
104	-305.01	-253.92	16.75	50	18.98

104	-305.01	-258.39	15.29	50	19.03
104	-305.01	-242.89	20.37	50	18.98
104	-305.01	-162.70	46.66	50	18.78
104	-305.01	-156.01	48.85	50	18.83
104	-305.01	-145.70	52.23	50	18.83
104	-305.01	-297.12	2.59	50	9.95
104	-305.01	-265.15	13.07	50	10.02
104	-305.01	-249.20	18.30	50	9.97
104	-305.01	-265.05	13.10	50	14.09
104	-305.01	-268.56	11.95	50	13.70
104	-305.01	-254.72	16.49	50	8.06
104	-305.01	-179.02	41.31	50	4.67
104	-305.01	-165.15	45.86	50	4.78
104	-305.01	-154.43	49.37	50	5.01
104	-305.01	-305.01	-0.00	50	4.44
104	-305.01	-281.84	7.60	50	5.83
104	-305.01	-255.82	16.13	50	7.25
Atoms	Optimal	Found	Error	Gen	Time
105	-308.36	-264.31	14.29	50	19.55
105	-308.36	-269.10	12.73	50	19.48
105	-308.36	-249.11	19.22	50	19.45
105	-308.36	-165.03	46.48	50	19.31
105	-308.36	-159.43	48.30	50	19.41
105	-308.36	-144.95	52.99	50	19.23
105	-308.36	-300.37	2.59	50	10.22
105	-308.36	-268.04	13.08	50	10.22
105	-308.36	-261.07	15.34	50	10.17
105	-308.36	-291.54	5.45	50	13.53
105	-308.36	-285.00	7.58	50	5.72
105	-308.36	-270.21	12.37	50	4.70
105	-308.36	-174.40	43.44	50	5.17
105	-308.36	-165.83	46.22	50	6.39
105	-308.36	-151.07	51.01	50	5.36
105	-308.36	-308.36	-0.00	50	4.73
105	-308.36	-285.69	7.35	50	8.19
105	-308.36	-265.55	13.88	50	13.27
Atoms	Optimal	Found	Error	Gen	Time
106	-311.77	-287.43	7.81	50	19.97
106	-311.77	-258.79	16.99	50	19.97
106	-311.77	-244.28	21.65	50	19.88
106	-311.77	-155.89	50.00	50	19.75
106	-311.77	-163.41	47.59	50	19.72
106	-311.77	-163.83	47.45	50	19.81
106	-311.77	-303.59	2.63	50	10.48
106	-311.77	-273.32	12.33	50	10.48

106	-311.77	-263.57	15.46	50	10.48
106	-311.77	-303.21	2.75	50	5.23
106	-311.77	-267.54	14.19	50	11.25
106	-311.77	-270.28	13.31	50	11.27
106	-311.77	-164.35	47.28	50	4.94
106	-311.77	-166.35	46.64	50	7.30
106	-311.77	-170.25	45.39	50	5.49
106	-311.77	-311.77	-0.00	50	4.92
106	-311.77	-290.31	6.88	50	9.91
106	-311.77	-267.04	14.35	50	24.80
Atoms	Optimal	Found	Error	Gen	Time
107	-315.11	-253.95	19.41	50	20.56
107	-315.11	-279.98	11.15	50	20.52
107	-315.11	-243.59	22.70	50	20.52
107	-315.11	-158.09	49.83	50	20.34
107	-315.11	-164.48	47.80	50	20.33
107	-315.11	-161.75	48.67	50	20.34
107	-315.11	-306.82	2.63	50	10.78
107	-315.11	-280.12	11.11	50	10.78
107	-315.11	-264.55	16.05	50	10.81
107	-315.11	-266.97	15.28	50	14.23
107	-315.11	-290.88	7.69	50	5.16
107	-315.11	-265.73	15.67	50	7.26
107	-315.11	-183.25	41.85	50	4.91
107	-315.11	-176.03	44.14	50	6.38
107	-315.11	-173.66	44.89	50	4.81
107	-315.11	-315.11	-0.00	50	5.08
107	-315.11	-292.78	7.09	50	8.27
107	-315.11	-267.97	14.96	50	28.33
Atoms	Optimal	Found	Error	Gen	Time
108	-318.40	-285.11	10.45	50	21.16
108	-318.40	-253.49	20.39	50	21.12
108	-318.40	-247.48	22.27	50	21.06
108	-318.40	-161.83	49.17	50	20.86
108	-318.40	-144.32	54.67	50	20.91
108	-318.40	-162.04	49.11	50	20.94
108	-318.40	-309.97	2.65	50	11.11
108	-318.40	-283.42	10.98	50	11.14
108	-318.40	-269.89	15.24	50	11.08
108	-318.40	-300.61	5.59	50	6.41
108	-318.40	-271.94	14.59	50	17.05
108	-318.40	-261.80	17.78	50	14.12
108	-318.40	-172.13	45.94	50	5.47
108	-318.40	-153.69	51.73	50	5.28
108	-318.40	-174.43	45.21	50	7.17

108	-318.40	-318.40	-0.00	50	4.86
108	-318.40	-294.53	7.50	50	10.50
108	-318.40	-287.10	9.83	50	13.56
Atoms	Optimal	Found	Error	Gen	Time
109	-320.62	-269.10	16.07	50	21.72
109	-320.62	-273.23	14.78	50	21.67
109	-320.62	-248.11	22.62	50	21.72
109	-320.62	-170.93	46.69	50	21.42
109	-320.62	-169.42	47.16	50	21.45
109	-320.62	-171.47	46.52	50	21.41
109	-320.62	-312.20	2.63	50	11.39
109	-320.62	-271.66	15.27	50	11.44
109	-320.62	-272.47	15.02	50	11.41
109	-320.62	-283.59	11.55	50	18.97
109	-320.62	-283.65	11.53	50	17.59
109	-320.62	-261.23	18.52	50	7.41
109	-320.62	-181.56	43.37	50	5.23
109	-320.62	-177.35	44.69	50	6.39
109	-320.62	-188.23	41.29	50	5.30
109	-320.62	-320.62	-0.00	50	5.16
109	-320.62	-297.24	7.29	50	5.64
109	-320.62	-289.99	9.55	50	14.16
Atoms	Optimal	Found	Error	Gen	Time
110	-323.94	-290.40	10.35	50	22.30
110	-323.94	-257.78	20.43	50	22.39
110	-323.94	-265.65	17.99	50	22.30
110	-323.94	-164.55	49.21	50	22.16
110	-323.94	3249.93	1103.24	50	22.05
110	-323.94	-157.60	51.35	50	22.14
110	-323.94	-315.25	2.68	50	11.75
110	-323.94	-281.97	12.96	50	11.73
110	-323.94	-274.72	15.19	50	11.72
110	-323.94	-313.56	3.21	50	5.34
110	-323.94	-279.47	13.73	50	15.14
110	-323.94	-282.92	12.66	50	7.59
110	-323.94	-173.69	46.38	50	5.39
110	-323.94	2012.51	721.25	50	57.67
110	-323.94	-163.98	49.38	50	6.75
110	-323.94	-323.94	-0.00	50	5.25
110	-323.94	-303.06	6.45	50	8.03
110	-323.94	-291.96	9.87	50	15.20
Atoms	Optimal	Found	Error	Gen	Time
111	-327.28	-273.56	16.41	50	22.88
111	-327.28	-277.34	15.26	50	22.97
111	-327.28	-261.11	20.22	50	22.92

111	-327.28	-159.20	51.36	50	22.72
111	-327.28	-186.90	42.89	50	22.67
111	-327.28	-172.24	47.37	50	22.69
111	-327.28	-318.41	2.71	50	12.02
111	-327.28	-285.77	12.68	50	12.06
111	-327.28	-267.73	18.20	50	12.00
111	-327.28	-285.99	12.62	50	8.67
111	-327.28	-286.82	12.36	50	14.33
111	-327.28	-274.17	16.23	50	7.27
111	-327.28	-168.35	48.56	50	5.66
111	-327.28	-194.05	40.71	50	7.42
111	-327.28	-181.49	44.55	50	5.24
111	-327.28	-327.28	-0.00	50	5.34
111	-327.28	-306.55	6.33	50	7.17
111	-327.28	-276.75	15.44	50	11.78
Atoms	Optimal	Found	Error	Gen	Time
112	-330.65	-297.80	9.93	50	23.50
112	-330.65	-270.82	18.09	50	23.50
112	-330.65	-260.27	21.29	50	23.53
112	-330.65	-177.10	46.44	50	23.36
112	-330.65	-170.85	48.33	50	23.34
112	-330.65	-149.34	54.83	50	23.31
112	-330.65	-321.38	2.80	50	12.36
112	-330.65	-290.37	12.18	50	12.36
112	-330.65	-271.00	18.04	50	12.38
112	-330.65	-319.02	3.52	50	5.69
112	-330.65	-283.57	14.24	50	17.70
112	-330.65	-275.82	16.58	50	11.42
112	-330.65	-190.81	42.29	50	6.31
112	-330.65	-195.23	40.95	50	5.97
112	-330.65	-166.34	49.69	50	9.94
112	-330.65	-330.65	-0.00	50	5.39
112	-330.65	-307.32	7.06	50	6.09
112	-330.65	-280.04	15.31	50	12.05
Atoms	Optimal	Found	Error	Gen	Time
113	-333.74	-295.81	11.36	50	24.28
113	-333.74	-282.47	15.36	50	24.31
113	-333.74	-264.71	20.68	50	24.33
113	-333.74	-171.22	48.70	50	24.14
113	-333.74	-165.31	50.47	50	24.33
113	-333.74	-160.12	52.02	50	23.92
113	-333.74	-324.49	2.77	50	12.69
113	-333.74	-285.90	14.33	50	12.70
113	-333.74	-271.67	18.60	50	12.67
113	-333.74	-317.39	4.90	50	6.11

113	-333.74	-297.51	10.86	50	15.55
113	-333.74	-277.52	16.84	50	8.66
113	-333.74	-191.24	42.70	50	6.88
113	-333.74	-184.92	44.59	50	6.03
113	-333.74	-166.06	50.24	50	5.95
113	-333.74	-333.74	-0.00	50	5.64
113	-333.74	-299.20	10.35	50	10.12
113	-333.74	-280.24	16.03	50	10.89
Atoms	Optimal	Found	Error	Gen	Time
114	-337.33	-285.74	15.29	50	24.95
114	-337.33	-295.34	12.45	50	24.88
114	-337.33	-275.23	18.41	50	24.70
114	-337.33	-165.28	51.00	50	24.52
114	-337.33	-151.31	55.14	50	24.48
114	-337.33	-159.05	52.85	50	24.52
114	-337.33	-327.50	2.91	50	13.00
114	-337.33	-295.66	12.35	50	12.98
114	-337.33	-289.11	14.30	50	13.02
114	-337.33	-306.86	9.03	50	15.39
114	-337.33	-309.61	8.22	50	6.58
114	-337.33	-293.74	12.92	50	6.45
114	-337.33	-176.30	47.74	50	6.11
114	-337.33	-157.91	53.19	50	6.11
114	-337.33	-165.30	51.00	50	7.19
114	-337.33	-337.33	-0.00	50	5.80
114	-337.33	-311.85	7.55	50	6.44
114	-337.33	-307.70	8.78	50	6.58
Atoms	Optimal	Found	Error	Gen	Time
115	-339.56	-281.24	17.17	50	25.38
115	-339.56	-297.15	12.49	50	25.45
115	-339.56	-278.38	18.02	50	25.39
115	-339.56	-159.31	53.09	50	25.05
115	-339.56	-174.16	48.71	50	25.14
115	-339.56	-166.74	50.90	50	25.06
115	-339.56	-329.75	2.89	50	13.33
115	-339.56	-298.03	12.23	50	13.31
115	-339.56	-291.90	14.04	50	13.36
115	-339.56	-292.78	13.78	50	24.42
115	-339.56	-312.80	7.88	50	16.83
115	-339.56	-287.77	15.25	50	13.34
115	-339.56	-165.36	51.30	50	11.19
115	-339.56	-183.91	45.84	50	6.47
115	-339.56	-178.73	47.37	50	6.58
115	-339.56	-339.56	-0.00	50	6.11
115	-339.56	-313.60	7.65	50	7.14

115	-339.56	-311.11	8.38	50	6.83
Atoms	Optimal	Found	Error	Gen	Time
116	-342.91	-283.63	17.29	50	26.00
116	-342.91	-294.84	14.02	50	25.97
116	-342.91	-282.23	17.70	50	26.02
116	-342.91	-177.72	48.17	50	25.73
116	-342.91	-178.11	48.06	50	25.77
116	-342.91	-170.58	50.26	50	25.77
116	-342.91	-332.72	2.97	50	13.66
116	-342.91	-307.10	10.44	50	13.69
116	-342.91	-294.91	14.00	50	13.69
116	-342.91	-300.76	12.29	50	18.28
116	-342.91	-303.81	11.40	50	10.12
116	-342.91	-299.31	12.72	50	7.30
116	-342.91	-191.81	44.06	50	6.38
116	-342.91	-191.24	44.23	50	6.11
116	-342.91	-191.64	44.11	50	6.52
116	-342.91	-342.91	-0.00	50	6.36
116	-342.91	-322.36	5.99	50	6.12
116	-342.91	-314.36	8.33	50	7.03
Atoms	Optimal	Found	Error	Gen	Time
117	-346.26	-282.75	18.34	50	26.77
117	-346.26	-296.48	14.38	50	26.77
117	-346.26	-292.76	15.45	50	26.70
117	-346.26	-155.46	55.10	50	26.48
117	-346.26	-188.15	45.66	50	26.50
117	-346.26	-167.73	51.56	50	26.52
117	-346.26	-335.95	2.98	50	14.03
117	-346.26	-310.12	10.44	50	14.05
117	-346.26	-302.27	12.70	50	14.05
117	-346.26	-297.16	14.18	50	17.78
117	-346.26	-307.40	11.22	50	21.81
117	-346.26	-307.21	11.28	50	9.70
117	-346.26	-159.12	54.05	50	27.64
117	-346.26	-200.23	42.18	50	6.86
117	-346.26	-177.42	48.76	50	6.62
117	-346.26	-346.26	-0.00	50	6.08
117	-346.26	-319.71	7.67	50	12.78
117	-346.26	-318.59	7.99	50	7.81
Atoms	Optimal	Found	Error	Gen	Time
118	-349.60	-289.19	17.28	50	27.44
118	-349.60	-292.33	16.38	50	27.53
118	-349.60	-293.40	16.08	50	27.84
118	-349.60	-169.34	51.56	50	27.69
118	-349.60	-199.98	42.80	50	27.38

118	-349.60	-167.76	52.01	50	27.34
118	-349.60	-339.17	2.98	50	14.56
118	-349.60	-312.29	10.67	50	14.66
118	-349.60	-305.22	12.70	50	14.64
118	-349.60	-308.98	11.62	50	15.56
118	-349.60	-308.55	11.74	50	10.30
118	-349.60	-309.29	11.53	50	7.39
118	-349.60	-184.70	47.17	50	6.84
118	-349.60	-214.99	38.50	50	6.64
118	-349.60	-176.84	49.42	50	7.62
118	-349.60	-349.60	-0.00	50	6.72
118	-349.60	-331.46	5.19	50	6.53
118	-349.60	-321.89	7.93	50	6.99
Atoms	Optimal	Found	Error	Gen	Time
119	-353.00	-305.43	13.48	50	28.59
119	-353.00	-294.87	16.47	50	28.38
119	-353.00	-259.49	26.49	50	28.47
119	-353.00	-171.19	51.50	50	28.09
119	-353.00	-175.02	50.42	50	28.45
119	-353.00	-170.98	51.56	50	28.30
119	-353.00	-342.35	3.02	50	14.91
119	-353.00	-314.63	10.87	50	14.91
119	-353.00	-307.49	12.89	50	14.95
119	-353.00	-333.01	5.66	50	10.00
119	-353.00	-310.62	12.01	50	9.81
119	-353.00	-291.07	17.54	50	7.44
119	-353.00	-186.85	47.07	50	6.70
119	-353.00	-189.21	46.40	50	6.80
119	-353.00	-186.92	47.05	50	7.80
119	-353.00	-353.00	-0.00	50	6.70
119	-353.00	-333.38	5.56	50	6.44
119	-353.00	-324.52	8.07	50	6.92
Atoms	Optimal	Found	Error	Gen	Time
120	-356.27	-310.42	12.87	50	29.16
120	-356.27	578145228051.49	162275544631.19	50	29.16
120	-356.27	-291.16	18.28	50	29.11
120	-356.27	-187.04	47.50	50	28.88
120	-356.27	2454.70	788.99	50	28.81
120	-356.27	-177.96	50.05	50	28.77
120	-356.27	-345.50	3.02	50	15.23
120	-356.27	-324.90	8.81	50	15.36
120	-356.27	-297.41	16.52	50	15.28
120	-356.27	-335.24	5.90	50	8.92
120	-356.27	287839771231.71	80791734335.67	50	92.59
120	-356.27	-302.86	14.99	50	13.53

120	-356.27	-199.85	43.91	50	6.74
120	-356.27	1958.68	649.77	50	77.88
120	-356.27	-193.79	45.61	50	7.01
120	-356.27	-356.27	-0.00	50	6.83
120	-356.27	-338.14	5.09	50	7.88
120	-356.27	-305.64	14.21	50	17.03
Atoms	Optimal	Found	Error	Gen	Time
121	-358.52	-301.89	15.80	50	29.94
121	-358.52	-331.65	7.49	50	30.02
121	-358.52	-297.97	16.89	50	29.95
121	-358.52	-168.41	53.03	50	29.55
121	-358.52	-173.34	51.65	50	29.62
121	-358.52	-178.47	50.22	50	29.72
121	-358.52	-347.75	3.00	50	15.77
121	-358.52	-331.66	7.49	50	15.62
121	-358.52	-300.74	16.12	50	15.77
121	-358.52	-314.68	12.23	50	23.88
121	-358.52	-340.21	5.11	50	7.09
121	-358.52	-318.00	11.30	50	7.80
121	-358.52	-179.41	49.96	50	7.33
121	-358.52	-184.93	48.42	50	6.97
121	-358.52	-206.04	42.53	50	8.14
121	-358.52	-358.52	-0.00	50	7.14
121	-358.52	-343.05	4.31	50	7.42
121	-358.52	-309.22	13.75	50	18.67
Atoms	Optimal	Found	Error	Gen	Time
122	-361.83	-326.10	9.87	50	30.56
122	-361.83	-300.23	17.02	50	30.66
122	-361.83	-290.46	19.73	50	30.80
122	-361.83	-179.58	50.37	50	30.56
122	-361.83	-186.61	48.43	50	30.23
122	-361.83	-183.66	49.24	50	30.25
122	-361.83	-350.85	3.04	50	15.98
122	-361.83	-331.33	8.43	50	16.05
122	-361.83	-303.90	16.01	50	16.00
122	-361.83	-351.09	2.97	50	7.95
122	-361.83	-313.59	13.33	50	27.14
122	-361.83	-312.69	13.58	50	7.92
122	-361.83	-190.74	47.29	50	7.45
122	-361.83	-196.37	45.73	50	7.44
122	-361.83	-199.84	44.77	50	8.11
122	-361.83	-361.83	-0.00	50	7.09
122	-361.83	-342.64	5.30	50	7.47
122	-361.83	-312.37	13.67	50	14.67
Atoms	Optimal	Found	Error	Gen	Time

123	-365.18	-298.27	18.32	50	31.56
123	-365.18	-300.40	17.74	50	31.55
123	-365.18	-299.90	17.88	50	32.00
123	-365.18	-175.70	51.89	50	30.84
123	-365.18	-190.97	47.71	50	31.23
123	-365.18	-196.28	46.25	50	31.09
123	-365.18	-354.11	3.03	50	16.64
123	-365.18	-334.59	8.38	50	16.61
123	-365.18	-306.93	15.95	50	16.56
123	-365.18	-317.14	13.16	50	15.39
123	-365.18	-316.86	13.23	50	8.16
123	-365.18	-315.45	13.62	50	8.81
123	-365.18	-186.45	48.94	50	10.33
123	-365.18	-207.59	43.15	50	9.72
123	-365.18	-208.63	42.87	50	7.44
123	-365.18	-365.18	-0.00	50	7.55
123	-365.18	-345.55	5.38	50	8.22
123	-365.18	-320.96	12.11	50	8.22
Atoms	Optimal	Found	Error	Gen	Time
124	-368.59	-297.86	19.19	50	32.06
124	-368.59	-305.89	17.01	50	32.22
124	-368.59	-291.92	20.80	50	32.08
124	-368.59	-179.31	51.35	50	32.23
124	-368.59	-196.99	46.56	50	32.39
124	-368.59	-169.34	54.06	50	32.67
124	-368.59	-357.35	3.05	50	17.03
124	-368.59	-336.37	8.74	50	16.86
124	-368.59	-309.89	15.93	50	16.88
124	-368.59	-309.41	16.06	50	10.39
124	-368.59	-315.98	14.27	50	27.81
124	-368.59	-315.39	14.43	50	8.86
124	-368.59	-190.74	48.25	50	8.09
124	-368.59	-216.68	41.21	50	7.91
124	-368.59	-182.14	50.59	50	9.09
124	-368.59	-368.59	-0.00	50	7.95
124	-368.59	-349.03	5.31	50	7.77
124	-368.59	-324.03	12.09	50	7.94
Atoms	Optimal	Found	Error	Gen	Time
125	-371.94	-305.40	17.89	50	33.14
125	-371.94	-326.39	12.25	50	33.08
125	-371.94	-306.10	17.70	50	33.19
125	-371.94	-168.30	54.75	50	32.66
125	-371.94	-177.28	52.34	50	32.69
125	-371.94	-195.09	47.55	50	32.77
125	-371.94	-360.59	3.05	50	17.42

125	-371.94	-338.53	8.98	50	17.77
125	-371.94	-312.23	16.05	50	17.58
125	-371.94	-319.03	14.23	50	27.08
125	-371.94	-342.12	8.02	50	18.14
125	-371.94	-320.16	13.92	50	7.80
125	-371.94	-182.92	50.82	50	8.52
125	-371.94	-186.52	49.85	50	8.38
125	-371.94	-210.00	43.54	50	7.80
125	-371.94	-371.94	-0.00	50	8.02
125	-371.94	-352.47	5.24	50	7.94
125	-371.94	-326.76	12.15	50	8.36
Atoms	Optimal	Found	Error	Gen	Time
126	-375.30	-329.61	12.18	50	34.05
126	-375.30	-328.98	12.34	50	34.00
126	-375.30	-304.44	18.88	50	33.89
126	-375.30	-186.23	50.38	50	33.80
126	-375.30	-174.35	53.54	50	33.92
126	-375.30	-184.11	50.94	50	34.03
126	-375.30	-363.78	3.07	50	18.17
126	-375.30	-347.68	7.36	50	17.92
126	-375.30	-318.33	15.18	50	17.97
126	-375.30	-358.26	4.54	50	8.36
126	-375.30	-343.17	8.56	50	11.89
126	-375.30	-331.49	11.68	50	9.50
126	-375.30	-200.85	46.48	50	8.83
126	-375.30	-198.65	47.07	50	9.53
126	-375.30	-196.44	47.66	50	8.09
126	-375.30	-375.30	-0.00	50	8.17
126	-375.30	-357.78	4.67	50	8.11
126	-375.30	-339.43	9.56	50	8.75
Atoms	Optimal	Found	Error	Gen	Time
127	-378.57	-317.12	16.23	50	35.17
127	-378.57	-336.96	10.99	50	34.95
127	-378.57	-311.32	17.77	50	35.33
127	-378.57	-179.41	52.61	50	34.73
127	-378.57	-188.44	50.22	50	34.34
127	-378.57	-190.83	49.59	50	34.12
127	-378.57	-366.85	3.10	50	18.33
127	-378.57	-347.22	8.28	50	18.27
127	-378.57	-320.75	15.27	50	18.09
127	-378.57	-346.80	8.39	50	10.73
127	-378.57	-351.57	7.13	50	9.45
127	-378.57	-327.94	13.37	50	8.64
127	-378.57	-186.87	50.64	50	8.33
127	-378.57	-202.82	46.42	50	9.88

127	-378.57	-214.82	43.26	50	18.59
127	-378.57	-378.57	-0.00	50	8.05
127	-378.57	-358.64	5.27	50	8.45
127	-378.57	-341.68	9.75	50	9.34
Atoms	Optimal	Found	Error	Gen	Time
128	-380.82	-327.27	14.06	50	35.83
128	-380.82	-315.34	17.19	50	35.80
128	-380.82	-293.23	23.00	50	35.72
128	-380.82	76599.63	20214.52	50	35.64
128	-380.82	-191.74	49.65	50	35.42
128	-380.82	-173.21	54.52	50	35.42
128	-380.82	-369.04	3.09	50	18.91
128	-380.82	-346.68	8.96	50	19.03
128	-380.82	-320.95	15.72	50	18.88
128	-380.82	-351.75	7.63	50	12.05
128	-380.82	-330.73	13.15	50	28.48
128	-380.82	-321.47	15.58	50	9.69
128	-380.82	12706.59	3436.66	50	70.70
128	-380.82	-201.99	46.96	50	8.66
128	-380.82	-195.66	48.62	50	8.53
128	-380.82	-380.82	-0.00	50	8.58
128	-380.82	-360.30	5.39	50	9.47
128	-380.82	-336.98	11.51	50	11.45
Atoms	Optimal	Found	Error	Gen	Time
129	-384.12	-317.75	17.28	50	36.41
129	-384.12	-336.30	12.45	50	36.20
129	-384.12	-299.66	21.99	50	36.38
129	-384.12	-214.50	44.16	50	35.92
129	-384.12	-188.92	50.82	50	36.28
129	-384.12	-189.96	50.55	50	36.16
129	-384.12	-372.05	3.14	50	19.11
129	-384.12	-350.84	8.66	50	19.42
129	-384.12	-328.75	14.41	50	19.33
129	-384.12	-335.01	12.79	50	13.36
129	-384.12	-354.67	7.67	50	13.39
129	-384.12	-325.41	15.29	50	8.70
129	-384.12	-240.30	37.44	50	8.70
129	-384.12	-221.48	42.34	50	10.83
129	-384.12	-202.54	47.27	50	9.44
129	-384.12	-384.12	-0.00	50	8.59
129	-384.12	-362.47	5.64	50	9.17
129	-384.12	-349.96	8.89	50	22.81
Atoms	Optimal	Found	Error	Gen	Time
130	-387.45	-323.00	16.63	50	37.22
130	-387.45	-321.75	16.96	50	37.27

130	-387.45	-310.44	19.87	50	37.31
130	-387.45	-187.46	51.62	50	36.77
130	-387.45	-184.12	52.48	50	36.77
130	-387.45	-176.31	54.49	50	36.83
130	-387.45	-375.14	3.18	50	19.59
130	-387.45	-353.53	8.75	50	19.62
130	-387.45	-331.39	14.47	50	19.47
130	-387.45	-345.54	10.82	50	11.73
130	-387.45	-335.73	13.35	50	24.67
130	-387.45	-335.64	13.37	50	9.23
130	-387.45	-194.18	49.88	50	11.42
130	-387.45	-205.10	47.06	50	9.19
130	-387.45	-181.15	53.25	50	9.28
130	-387.45	-387.45	-0.00	50	8.72
130	-387.45	-366.57	5.39	50	9.31
130	-387.45	-352.42	9.04	50	25.38
Atoms	Optimal	Found	Error	Gen	Time
131	-390.80	-350.35	10.35	50	37.92
131	-390.80	-356.95	8.66	50	37.94
131	-390.80	-314.39	19.55	50	37.94
131	-390.80	-187.28	52.08	50	37.56
131	-390.80	-185.84	52.45	50	37.64
131	-390.80	-186.99	52.15	50	37.55
131	-390.80	-378.03	3.27	50	20.02
131	-390.80	-357.80	8.45	50	20.00
131	-390.80	-330.69	15.38	50	19.94
131	-390.80	-377.89	3.30	50	9.06
131	-390.80	-366.95	6.10	50	11.05
131	-390.80	-333.54	14.65	50	16.03
131	-390.80	-210.16	46.22	50	12.44
131	-390.80	-196.92	49.61	50	10.30
131	-390.80	-192.14	50.83	50	10.55
131	-390.80	-390.80	-0.00	50	8.89
131	-390.80	-370.31	5.24	50	9.69
131	-390.80	-352.98	9.68	50	22.83
Atoms	Optimal	Found	Error	Gen	Time
132	-393.92	-334.97	14.96	50	39.08
132	-393.92	-338.02	14.19	50	38.92
132	-393.92	-311.28	20.98	50	39.05
132	-393.92	-184.17	53.25	50	38.39
132	-393.92	-192.07	51.24	50	39.17
132	-393.92	-196.12	50.21	50	39.03
132	-393.92	-381.12	3.25	50	20.31
132	-393.92	-334.07	15.19	50	20.31
132	-393.92	-331.96	15.73	50	20.42

132	-393.92	-357.58	9.23	50	18.69
132	-393.92	-357.65	9.21	50	13.66
132	-393.92	-323.66	17.84	50	11.09
132	-393.92	-194.08	50.73	50	14.75
132	-393.92	-204.80	48.01	50	9.97
132	-393.92	-204.23	48.16	50	12.44
132	-393.92	-393.92	-0.00	50	9.27
132	-393.92	-343.64	12.76	50	26.03
132	-393.92	-341.00	13.43	50	19.94
Atoms	Optimal	Found	Error	Gen	Time
133	-397.53	-324.35	18.41	50	39.72
133	-397.53	-354.93	10.72	50	40.22
133	-397.53	-307.93	22.54	50	39.72
133	-397.53	-200.32	49.61	50	39.59
133	-397.53	10458.00	2730.75	50	39.75
133	-397.53	-207.69	47.75	50	39.83
133	-397.53	-384.18	3.36	50	21.11
133	-397.53	-337.43	15.12	50	21.25
133	-397.53	-333.92	16.00	50	20.92
133	-397.53	-350.29	11.88	50	11.59
133	-397.53	-367.33	7.60	50	16.34
133	-397.53	-329.30	17.16	50	11.77
133	-397.53	-212.02	46.67	50	9.53
133	-397.53	4725.80	1288.79	50	72.67
133	-397.53	-231.28	41.82	50	10.66
133	-397.53	-397.53	-0.00	50	9.41
133	-397.53	-352.10	11.43	50	28.02
133	-397.53	-343.22	13.66	50	22.59
Atoms	Optimal	Found	Error	Gen	Time
134	-399.77	-337.39	15.60	50	40.88
134	-399.77	-331.20	17.15	50	41.27
134	-399.77	-309.50	22.58	50	41.11
134	-399.77	-200.28	49.90	50	40.77
134	-399.77	-218.63	45.31	50	40.58
134	-399.77	-196.24	50.91	50	40.52
134	-399.77	-386.43	3.34	50	21.34
134	-399.77	-362.76	9.26	50	21.30
134	-399.77	-336.55	15.81	50	21.36
134	-399.77	-362.82	9.24	50	27.84
134	-399.77	-344.64	13.79	50	24.97
134	-399.77	-325.19	18.66	50	13.94
134	-399.77	-223.67	44.05	50	10.73
134	-399.77	-227.19	43.17	50	9.42
134	-399.77	-202.33	49.39	50	11.08
134	-399.77	-399.77	-0.00	50	9.67

134	-399.77	-376.22	5.89	50	9.91
134	-399.77	-346.65	13.29	50	17.14
Atoms	Optimal	Found	Error	Gen	Time
135	-402.50	-347.57	13.65	50	41.78
135	-402.50	-329.14	18.23	50	42.11
135	-402.50	-310.14	22.95	50	41.92
135	-402.50	-215.18	46.54	50	41.19
135	-402.50	8267.66	2154.06	50	41.91
135	-402.50	-211.59	47.43	50	41.69
135	-402.50	-389.22	3.30	50	22.17
135	-402.50	-367.27	8.75	50	22.14
135	-402.50	-342.40	14.93	50	22.11
135	-402.50	-370.57	7.93	50	18.64
135	-402.50	-348.65	13.38	50	25.05
135	-402.50	-327.32	18.68	50	12.48
135	-402.50	-225.89	43.88	50	9.94
135	-402.50	2575.16	739.78	50	62.09
135	-402.50	-219.41	45.49	50	29.64
135	-402.50	-402.50	-0.00	50	9.84
135	-402.50	-378.29	6.02	50	10.09
135	-402.50	-364.62	9.41	50	9.98
Atoms	Optimal	Found	Error	Gen	Time
136	-406.44	-336.52	17.20	50	42.97
136	-406.44	-355.78	12.46	50	43.03
136	-406.44	-319.87	21.30	50	43.86
136	-406.44	-204.69	49.64	50	43.56
136	-406.44	-227.18	44.11	50	43.38
136	-406.44	-199.73	50.86	50	43.12
136	-406.44	-392.26	3.49	50	23.20
136	-406.44	-357.16	12.13	50	23.06
136	-406.44	-345.19	15.07	50	22.97
136	-406.44	-362.90	10.71	50	21.41
136	-406.44	-380.18	6.46	50	11.66
136	-406.44	-339.77	16.40	50	12.77
136	-406.44	-214.71	47.17	50	10.95
136	-406.44	-250.37	38.40	50	10.14
136	-406.44	-208.67	48.66	50	10.02
136	-406.44	-406.44	-0.00	50	9.83
136	-406.44	-371.83	8.52	50	13.81
136	-406.44	-371.42	8.62	50	10.09
Atoms	Optimal	Found	Error	Gen	Time
137	-409.78	-334.55	18.36	50	44.03
137	-409.78	-327.75	20.02	50	43.92
137	-409.78	-312.65	23.70	50	44.06
137	-409.78	-189.18	53.83	50	43.83

137	-409.78	-206.98	49.49	50	43.30
137	-409.78	-200.70	51.02	50	43.56
137	-409.78	-395.46	3.49	50	22.91
137	-409.78	-368.22	10.14	50	22.98
137	-409.78	-341.52	16.66	50	22.97
137	-409.78	-356.62	12.97	50	13.92
137	-409.78	-341.92	16.56	50	28.92
137	-409.78	-331.69	19.06	50	18.53
137	-409.78	-199.91	51.22	50	10.94
137	-409.78	-222.76	45.64	50	10.67
137	-409.78	-214.75	47.59	50	10.27
137	-409.78	-409.78	-0.00	50	10.66
137	-409.78	-382.58	6.64	50	10.53
137	-409.78	-365.06	10.91	50	10.36
Atoms	Optimal	Found	Error	Gen	Time
138	-413.14	-364.68	11.73	50	44.75
138	-413.14	-328.39	20.51	50	44.72
138	-413.14	-336.23	18.62	50	44.67
138	-413.14	-193.20	53.24	50	44.13
138	-413.14	-214.58	48.06	50	44.17
138	-413.14	-206.49	50.02	50	44.20
138	-413.14	-398.58	3.52	50	23.50
138	-413.14	-384.23	7.00	50	23.38
138	-413.14	-369.50	10.56	50	23.42
138	-413.14	-392.62	4.97	50	10.75
138	-413.14	-356.75	13.65	50	25.34
138	-413.14	-360.55	12.73	50	14.00
138	-413.14	-197.41	52.22	50	11.44
138	-413.14	-229.57	44.43	50	11.02
138	-413.14	-221.45	46.40	50	11.16
138	-413.14	-413.14	-0.00	50	10.39
138	-413.14	-394.70	4.46	50	10.41
138	-413.14	-393.73	4.70	50	12.14
Atoms	Optimal	Found	Error	Gen	Time
139	-416.53	-351.44	15.63	50	45.73
139	-416.53	-337.38	19.00	50	46.06
139	-416.53	-326.79	21.54	50	45.80
139	-416.53	-203.37	51.18	50	45.31
139	-416.53	-193.70	53.50	50	45.67
139	-416.53	-196.50	52.83	50	45.36
139	-416.53	-401.62	3.58	50	24.27
139	-416.53	-384.74	7.63	50	24.41
139	-416.53	-372.51	10.57	50	24.13
139	-416.53	-384.88	7.60	50	11.73
139	-416.53	-358.36	13.96	50	19.12

139	-416.53	-367.30	11.82	50	11.48
139	-416.53	-213.22	48.81	50	15.36
139	-416.53	-206.48	50.43	50	11.88
139	-416.53	-208.26	50.00	50	12.00
139	-416.53	-416.53	-0.00	50	11.23
139	-416.53	-395.67	5.01	50	11.44
139	-416.53	-397.23	4.63	50	13.02
Atoms	Optimal	Found	Error	Gen	Time
140	-419.81	-342.50	18.42	50	47.58
140	-419.81	-353.31	15.84	50	47.25
140	-419.81	-347.00	17.35	50	47.16
140	-419.81	-213.24	49.21	50	46.25
140	-419.81	-210.79	49.79	50	46.22
140	-419.81	35430.20	8539.52	50	46.03
140	-419.81	-404.72	3.60	50	24.45
140	-419.81	-388.42	7.48	50	24.45
140	-419.81	-375.50	10.56	50	24.56
140	-419.81	-375.21	10.62	50	15.88
140	-419.81	-369.22	12.05	50	28.75
140	-419.81	-364.73	13.12	50	12.14
140	-419.81	-234.27	44.20	50	11.41
140	-419.81	-226.31	46.09	50	12.44
140	-419.81	8378.80	2095.84	50	113.56
140	-419.81	-419.81	-0.00	50	10.69
140	-419.81	-399.48	4.84	50	11.22
140	-419.81	-400.76	4.54	50	12.03
Atoms	Optimal	Found	Error	Gen	Time
141	-422.05	-352.65	16.44	50	47.84
141	-422.05	-350.28	17.01	50	47.94
141	-422.05	-338.07	19.90	50	48.02
141	-422.05	-189.40	55.12	50	47.55
141	-422.05	-213.96	49.30	50	47.97
141	-422.05	-182.55	56.75	50	47.88
141	-422.05	-406.97	3.57	50	25.25
141	-422.05	-384.44	8.91	50	25.09
141	-422.05	-352.51	16.48	50	25.45
141	-422.05	-383.41	9.16	50	19.64
141	-422.05	-375.71	10.98	50	16.42
141	-422.05	-358.48	15.06	50	14.30
141	-422.05	-200.93	52.39	50	13.00
141	-422.05	-228.78	45.79	50	11.64
141	-422.05	-206.35	51.11	50	13.52
141	-422.05	-422.05	-0.00	50	11.41
141	-422.05	-398.60	5.56	50	11.77
141	-422.05	-372.63	11.71	50	15.87

Atoms	Optimal	Found	Error	Gen	Time
142	-425.38	-358.02	15.84	50	48.72
142	-425.38	-340.04	20.06	50	48.80
142	-425.38	-331.23	22.13	50	48.69
142	-425.38	-217.17	48.95	50	47.92
142	-425.38	-213.08	49.91	50	47.97
142	-425.38	-207.93	51.12	50	48.14
142	-425.38	-409.85	3.65	50	25.62
142	-425.38	-383.07	9.95	50	25.33
142	-425.38	-354.88	16.57	50	25.38
142	-425.38	-381.86	10.23	50	33.61
142	-425.38	-354.55	16.65	50	42.45
142	-425.38	-350.52	17.60	50	11.94
142	-425.38	-227.25	46.58	50	12.56
142	-425.38	-225.89	46.90	50	13.28
142	-425.38	-223.46	47.47	50	11.91
142	-425.38	-425.38	-0.00	50	11.70
142	-425.38	-401.49	5.62	50	12.27
142	-425.38	-374.14	12.05	50	16.94
Atoms	Optimal	Found	Error	Gen	Time
143	-428.72	-357.43	16.63	50	50.27
143	-428.72	-356.45	16.86	50	50.25
143	-428.72	-339.37	20.84	50	50.78
143	-428.72	-208.72	51.31	50	50.13
143	-428.72	-216.95	49.40	50	50.17
143	-428.72	-203.47	52.54	50	50.03
143	-428.72	-413.04	3.66	50	26.08
143	-428.72	-386.84	9.77	50	26.25
143	-428.72	-356.34	16.88	50	26.11
143	-428.72	-379.25	11.54	50	14.80
143	-428.72	-369.31	13.86	50	27.33
143	-428.72	-371.16	13.43	50	13.48
143	-428.72	-231.77	45.94	50	12.80
143	-428.72	-232.39	45.79	50	11.86
143	-428.72	-209.65	51.10	50	12.47
143	-428.72	-428.72	-0.00	50	12.50
143	-428.72	-402.41	6.14	50	11.98
143	-428.72	-374.97	12.54	50	27.44
Atoms	Optimal	Found	Error	Gen	Time
144	-432.11	-367.57	14.94	50	51.28
144	-432.11	-348.64	19.32	50	50.95
144	-432.11	-345.77	19.98	50	51.02
144	-432.11	-226.61	47.56	50	50.22
144	-432.11	1254.20	390.25	50	50.39
144	-432.11	-209.49	51.52	50	50.41

144	-432.11	-416.25	3.67	50	26.66
144	-432.11	-401.31	7.13	50	26.73
144	-432.11	-354.67	17.92	50	26.66
144	-432.11	-383.28	11.30	50	27.39
144	-432.11	-368.18	14.79	50	18.47
144	-432.11	-364.50	15.65	50	12.08
144	-432.11	-244.36	43.45	50	11.88
144	-432.11	-15.96	96.31	50	90.69
144	-432.11	-224.84	47.97	50	14.02
144	-432.11	-432.11	-0.00	50	11.44
144	-432.11	-413.40	4.33	50	12.11
144	-432.11	-372.43	13.81	50	12.89
Atoms	Optimal	Found	Error	Gen	Time
145	-435.49	-360.37	17.25	50	52.14
145	-435.49	-359.58	17.43	50	52.39
145	-435.49	-348.03	20.08	50	52.47
145	-435.49	-212.68	51.16	50	51.58
145	-435.49	-222.05	49.01	50	51.39
145	-435.49	-209.61	51.87	50	51.47
145	-435.49	-419.37	3.70	50	27.22
145	-435.49	-393.20	9.71	50	27.34
145	-435.49	-357.26	17.96	50	27.19
145	-435.49	-380.69	12.58	50	13.88
145	-435.49	-373.93	14.14	50	24.31
145	-435.49	-366.99	15.73	50	13.25
145	-435.49	-226.22	48.05	50	12.73
145	-435.49	-236.83	45.62	50	13.23
145	-435.49	-219.85	49.52	50	12.34
145	-435.49	-435.49	-0.00	50	12.75
145	-435.49	-408.26	6.25	50	12.50
145	-435.49	-374.86	13.92	50	13.48
Atoms	Optimal	Found	Error	Gen	Time
146	-438.86	-370.37	15.61	50	52.88
146	-438.86	-362.56	17.39	50	53.33
146	-438.86	-354.54	19.21	50	54.31
146	-438.86	-223.87	48.99	50	53.17
146	-438.86	-224.89	48.76	50	53.91
146	-438.86	-201.90	53.99	50	53.70
146	-438.86	-422.56	3.71	50	28.02
146	-438.86	-396.07	9.75	50	28.19
146	-438.86	-360.21	17.92	50	28.41
146	-438.86	-384.88	12.30	50	31.11
146	-438.86	-382.84	12.77	50	16.00
146	-438.86	-370.22	15.64	50	14.81
146	-438.86	-240.71	45.15	50	13.39

146	-438.86	-232.79	46.96	50	14.70
146	-438.86	-214.90	51.03	50	13.59
146	-438.86	-438.86	-0.00	50	12.44
146	-438.86	-410.47	6.47	50	12.89
146	-438.86	-377.11	14.07	50	15.98
Atoms	Optimal	Found	Error	Gen	Time
147	-442.12	-381.84	13.64	50	55.70
147	-442.12	-350.12	20.81	50	55.58
147	-442.12	-349.65	20.92	50	54.95
147	-442.12	-201.65	54.39	50	54.89
147	-442.12	1673.59	478.54	50	54.86
147	-442.12	-231.43	47.65	50	54.73
147	-442.12	-425.66	3.72	50	29.16
147	-442.12	-397.14	10.17	50	29.06
147	-442.12	-374.19	15.36	50	28.89
147	-442.12	-418.04	5.45	50	12.77
147	-442.12	-368.82	16.58	50	41.88
147	-442.12	-376.28	14.89	50	13.97
147	-442.12	-212.79	51.87	50	13.70
147	-442.12	1118.16	352.91	50	137.03
147	-442.12	-246.46	44.26	50	17.30
147	-442.12	-442.12	-0.00	50	13.25
147	-442.12	-414.79	6.18	50	13.62
147	-442.12	-395.39	10.57	50	32.08
Atoms	Optimal	Found	Error	Gen	Time
148	-444.36	-376.55	15.26	50	56.23
148	-444.36	-372.99	16.06	50	56.20
148	-444.36	-358.89	19.23	50	56.45
148	-444.36	8354.78	1980.19	50	56.09
148	-444.36	-231.77	47.84	50	56.00
148	-444.36	-230.80	48.06	50	57.25
148	-444.36	-427.90	3.71	50	30.25
148	-444.36	-407.12	8.38	50	29.73
148	-444.36	-376.64	15.24	50	29.92
148	-444.36	-409.98	7.74	50	18.31
148	-444.36	-390.27	12.17	50	13.73
148	-444.36	-378.40	14.84	50	14.55
148	-444.36	7974.29	1894.56	50	174.38
148	-444.36	-243.50	45.20	50	15.48
148	-444.36	-250.58	43.61	50	14.91
148	-444.36	-444.36	-0.00	50	13.52
148	-444.36	-420.67	5.33	50	13.52
148	-444.36	-397.87	10.46	50	36.17
Atoms	Optimal	Found	Error	Gen	Time
149	-447.65	-384.17	14.18	50	58.22

149	-447.65	-370.80	17.17	50	57.92
149	-447.65	-359.86	19.61	50	57.56
149	-447.65	-218.99	51.08	50	56.66
149	-447.65	-224.04	49.95	50	57.45
149	-447.65	-213.72	52.26	50	58.25
149	-447.65	-430.82	3.76	50	30.75
149	-447.65	-412.91	7.76	50	30.05
149	-447.65	-376.75	15.84	50	30.11
149	-447.65	-418.85	6.44	50	15.62
149	-447.65	-389.24	13.05	50	32.17
149	-447.65	-384.72	14.06	50	14.05
149	-447.65	-244.42	45.40	50	16.22
149	-447.65	-233.79	47.77	50	17.66
149	-447.65	-230.11	48.60	50	14.38
149	-447.65	-447.65	-0.00	50	13.44
149	-447.65	-423.12	5.48	50	14.34
149	-447.65	-398.16	11.06	50	36.98
Atoms	Optimal	Found	Error	Gen	Time
150	-450.98	-377.74	16.24	50	58.69
150	-450.98	-387.83	14.00	50	59.62
150	-450.98	-356.82	20.88	50	59.69
150	-450.98	-218.02	51.66	50	57.16
150	-450.98	-212.88	52.80	50	56.72
150	-450.98	-222.17	50.74	50	56.06
150	-450.98	-433.98	3.77	50	29.89
150	-450.98	-411.07	8.85	50	29.75
150	-450.98	-389.19	13.70	50	29.75
150	-450.98	-400.69	11.15	50	15.66
150	-450.98	-399.10	11.50	50	34.52
150	-450.98	-379.13	15.93	50	15.25
150	-450.98	-244.47	45.79	50	14.92
150	-450.98	-240.06	46.77	50	14.25
150	-450.98	-233.98	48.12	50	13.47
150	-450.98	-450.98	-0.00	50	13.06
150	-450.98	-424.82	5.80	50	13.42
150	-450.98	-406.63	9.83	50	13.69