International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Study on Fabrication and Characterization of Alchemic Metal

Dr. Kumar.K[1], Haritha. T[2], Sai Venkat. K[3], Balaji.P[4], Manoj.B[5], Venkata Vamsi. G[6]

[1]Dr K. Kumar, Department of Mechanical Engineering, Associate Professor, Annamacharya Institute of Technology & Science, Tirupati, Andhra Pradesh, India
[2,3,4,5,6]B. Tech Students of Mechanical Engineering Department, Annamacharya Institute of Technology & Science, Tirupati, Andhra Pradesh, India

Abstract

In this Research, The Preparation and characterization of gold(Ag) Particles by Biosynthesis process are carried out. In this synthesis of gold Particles, Green Leafy vegetables and salts like Saltpetre and Ammonium Sulphate are being used as a base agent to get down the proton in the semi-synthesized gold particles. After the Attraction of proton The synthesized gold particles are formed Then Morphological Characteristics such as UV-spectroscopy is to observe the formation of gold particles, XRD analysis is carried out to study the crystallinity, the orientation and shape, Size of gold particles are observed through SEM analysis. Finally, FTIR Measurements are used to identify the presence of various chemical groups in synthesized Gold particles. Hence The synthesized Particles may be used for different coating applications.

Keywords: Biosynthesis, XRD analysis, Ammonium Sulphate, protons,Alchemy, mercury sulphate, SEM analysis.

Introduction

Metals are the perfect material for usage in a wide range of applications because of their numerous distinctive fundamental features. Metals have several benefits, some of which are high tensile strength, high fracture toughness, malleability, and availability. In general, metals are ductile, fusible (able to be fused or melted), and malleable—they may be permanently bent or pounded out of form without breaking or shattering.. Metals in general have high electrical conductivity, high thermal conductivity, and high density . Metals are generally not used in their pure state but as mixtures of metals or metal and non metal constituents commonly referred to as alloys. Mechanical properties of metals include ductility, i.e. their capacity for plastic deformation. Hooke's Law for restoring forces, which states that stress is directly proportional to strain, may be used to explain reversible elastic deformation in metals. Plastic deformation, sometimes referred to as plasticity, is the persistent (irreversible) deformation of an object caused by forces greater than the elastic limit or heat.. Most metals are present in the Earth as compounds of some sort, such as oxides or sulphides. The metals react to acids where as for Gold, it is non-acidic.
Alchemy is frequently linked to the transformation of metals, particularly the endeavour to transform common metals like lead into precious metals like gold. This branch of alchemy, called "chrysopoeia,"

was driven by both religious and pragmatic reasons. Alchemists were interested in finding a practical way to make money by turning less expensive and more plentiful resources into gold
Gold is a precious metal prized for its rarity, beauty, and durability. It has been used for currency, jewelry, and various industrial applications for centuries. Its value often remains stable or increases over time, making it a popular investment choice. Additionally, gold is also used electronics, dentistry, and aerospace industries due to its excellent conductivity and corrosion resistance.

Materials

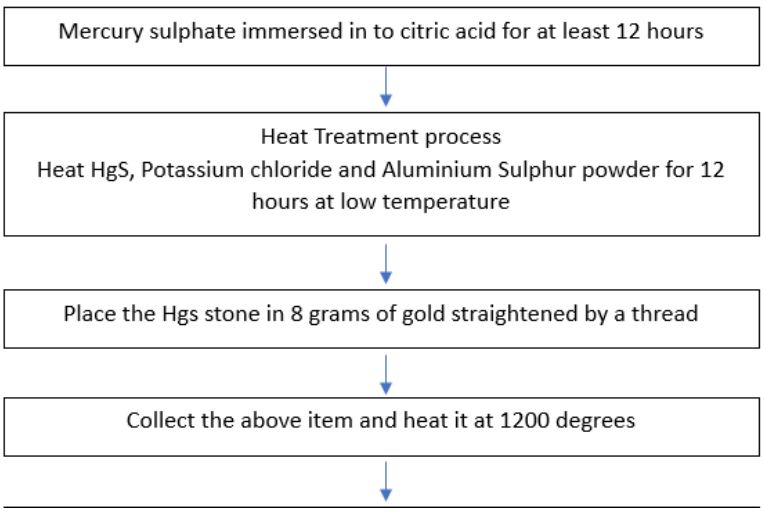
- Gold
- Copper
- Zinc
- Brass
- Mercury Sulphate
- Saltpetre
- Citric acid

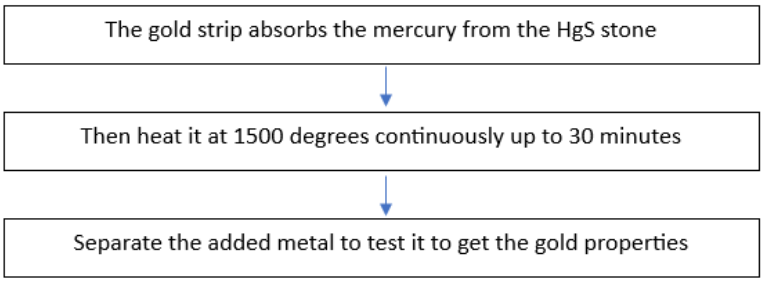
Different salts used in the experiment and their properties:

Table 1:List of materials

	Formula	Molar Mass	Melting point	Density	Boiling Point	Soluble in
Potassium nitrate	KNO3A	101.1032	334	2.11	400	Water, Ammonia, Glycero
Sodium chloride	NaCl	58.44	801	2.16	1465	Water, Ammonia, Ethanol, Methanol, Glycerol, Formic acid, Proplene glycol, formamide
Potassium aluminium sulphate	KAL(SO4)2	474.39	92.5	1.76	200	water
Ammonium chloride	NH4Cl	53.49	338	1.53	520	-
Borax	Na2B4O7·10H2O	381.37	743	1.73	1000	-

Methodology:





Experimental procedure :

In this process, we used 5 different types of salts to enhance the properties and molecular strength of the metals. Approximately 1 litre of citric acid was extracted from the lemons required for the whole process.

- The following salt powders are prepared for the next process
  - Potassium Nitrate(50gms)
  - Sodium Chloride(50gms)
  - Borax(50gms)
  - Potassium Aluminum Sulphate(50gms)
  - Ammonium Chloride(50gms)
- These salts are turned into fine powders and half amount of the powder is placed into the pan as layer and the dipped Mercury Sulphate is placed in th middle of the pan.

Figure 1: Mercury sulphate placed in the salts

- The remaining powder is poured as another layer on top of the mercury sulphate, then citric acid is poured around the mixture has been kept on the medium 3emperature

Figure 2: pouring citric acid

- The mixture which was heated at a low flame for 8 hours, this mixture has been converted as foam.This foam has to be removed gently, then remaining mercury sulphate has to be kept aside till it gets cooled.

Figure 3: Foam surfacing on the pan

- Take a cloth, the cloth has to be dipped in the clay soil liquid. Then the same dipped cloth has to be wrapped around the mercury sulphhate with no gap.
- The cow dug pats has to be smashed and 30 gramss powder of cow dung pats and mercury sulphate, has to be burnt together. The same process has to be repeated for 4 times with double the quantity of cow dung pats each time.
- Then the mercury sulphate has to be removed and let it cool down, then remove the clay soil cloth. Then take 8 grams of gold sheet, wrap the mercury sulphate tightly and tie with gold thread.
- Then place the gold wrapped mercury sulphate in the crucible.
- Then place the crucible in the furnace with high flame. So, that the whole content will be melted.
- Then some amount of mercury sulphate will be converted as gold and the remaining amount of mercury sulphate will be vaporized.
- So, for the remaining metals like zinc silver and copper can also be made by using the above process.
- So, that the above written metals will turn into alchemy(gold) metal

Result

The gold is extracted from the small furnace has shown a significant amount of particles are increased And the resulted gold is as shown in the figure and also experimented results on another metals has also shown some improvement in the properties.

Figure 4: Processed gold

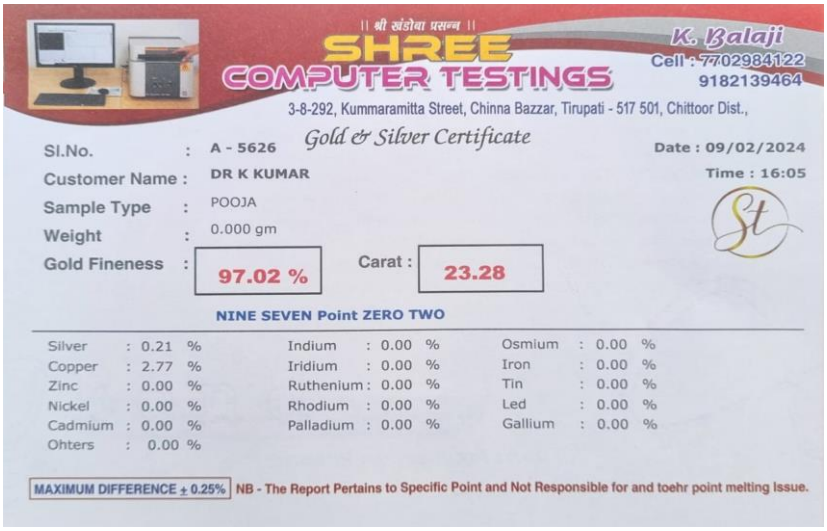


Figure 5: Gold test

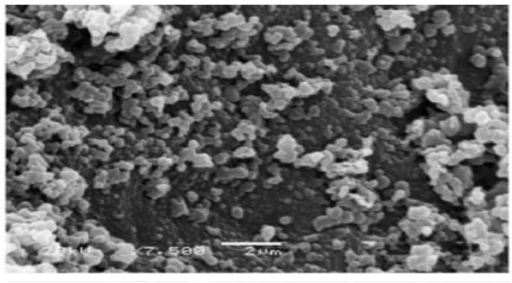


Figure 6 : Mercury

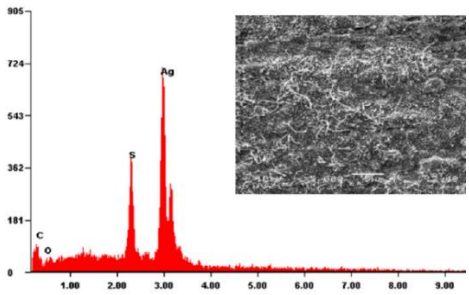


Figure 7 : Silver

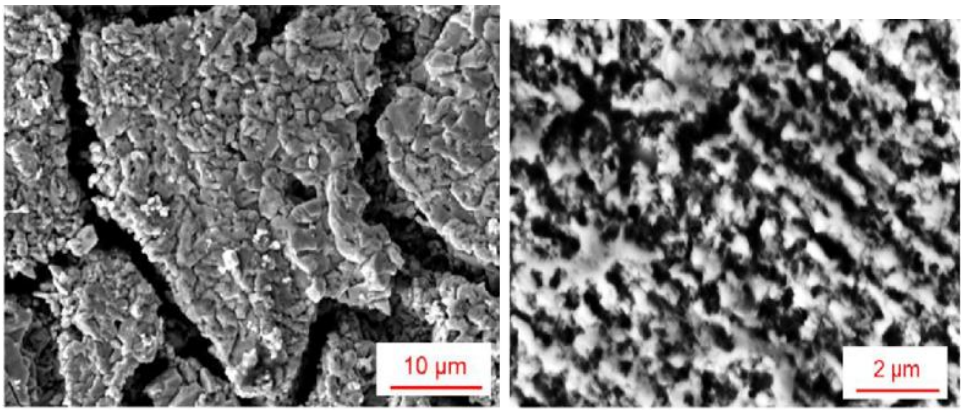


Figure 8 : Brass

Conclusion

In this experimental study, The metals have shown a different physical and mechanical properties and the ionization of the metals have decreased and has and the alchemic metal is produced by the process and are noble in nature Studies on Metals Used

• The gold used in in this experiment is of 8 grams and the resulted fabricated gold shown 300mg above the actual gold used in the beginning of the experiment.

• Other metals used in the experiment have also shown a significant amount of development in mechanical properties and chemical properties

SEM images of other metals that are improved with alchemy

References

1. Saurabh Vinod Parmar, Vidya Avasare. Syn-Aminoauration versus Anti-Aminoauration of Alkynes in Au(I)/Au(III) Catalysis: Understanding the Origin of Selectivity. The Journal of Organic Chemistry 2024, 89 (5) , 2951-2963.
2. Abdullah S. Alshreimi, Guanqun Zhang, Esther J. Shim, Donald J. Wink, Laura L. Anderson. Gold-Catalyzed N-Alkenylation of Isoxazolines and the Use of Alkenyl Gold Intermediates in the Synthesis of 2-Amino-1-pyrrolines. ACS Catalysis 2024, 14 (4) , 2229- 2234.
3. Jacopo Segato, Eleonora Aneggi, Walter Baratta, Filippo Campagnolo, Leonardo Belpassi, Paola Belanzoni, Daniele Zuccaccia. Experimental and Theoretical Investigation of Ion Pairing in Gold(III) Catalysts. Organometallics 2023, 42 (20) , 2973- 2982.
4. Moushakhi Ghosh, Shabana Khan. N-Heterocyclic Carbenes Capped Metal Nanoparticles: An Overview of Their Catalytic Scope. ACS Catalysis 2023, 13 (14) , 9313- 9325.
5. Miquel Navarro, Markus Holzapfel, Jesús Campos. A Cavity-Shaped Gold(I) Fragment Enables CO2 Insertion into Au–OH and Au–NH Bonds. Inorganic Chemistry 2023, 62 (27) , 10582-10591.
6. Nikolaos V. Tzouras, Leandros P. Zorba, Entzy Kaplanai, Nikolaos Tsoureas, David J. Nelson, Steven P. Nolan, Georgios C. Vougioukalakis. Hexafluoroisopropanol (HFIP) as a Multifunctional Agent in Gold-Catalyzed Cycloisomerizations and Sequential Transformations. ACS Catalysis 2023, 13 (13) , 8845- 8860.
7. Giuseppe Zuccarello, Leonardo J. Nannini, Ana Arroyo-Bondía, Nicolás Fincias, Isabel Arranz, Alba H. Pérez-Jimeno, Matthias Peeters, Inmaculada Martín-Torres, Anna Sadurní, Víctor García-Vázquez, Yufei Wang, Mariia S. Kirillova, Marc Montesinos-Magraner, Ulysse Caniparoli, Gonzalo D. Núñez, Feliu Maseras, Maria Besora, Imma Escofet, Antonio M. Echavarren. Enantioselective Catalysis with Pyrrolidinyl Gold(I) Complexes: DFT and NEST Analysis of the Chiral Binding Pocket. JACS Au 2023, 3 (6) , 1742- 1754.
8. Cyril A. Theulier, Yago García-Rodeja, Karinne Miqueu, Ghenwa Bouhadir, Didier Bourissou. Lewis Acid-Assisted C(sp3)–C(sp3) Reductive Elimination at Gold. Journal of the American Chemical Society 2023, 145 (19) , 10800- 10808.
9. Jiang Zhu, Jiaji Li, Lianjie Zhang, Shitao Sun, Zhaobo Wang, Xiang Li, Lu Yang, Maosheng Cheng, Bin Lin, Yongxiang Liu. Quantum Mechanical Prediction and Experimental Verification of Au(I)-Catalyzed Substitution-Controlled Syntheses of 1HPyrido[4,3-b]indole and Spiro[indoline-3,3′-pyridine] Derivatives. The Journal of Organic Chemistry 2023, 88 (9) , 5483-5496.
10. Shashank P. Sancheti, Dibya Jyoti Mondal, Nitin T. Patil. Fluorination of α-Imino Gold Carbenes to Access C3-Fluorinated Aza-Heterocycles. ACS Catalysis 2023, 13 (7) , 4391- 4397.

11. R. Holliday and P. Goodman, "Going for gold [gold in electronics industry]," in *IEE Review*, vol. 48, no. 3, pp. 15-19, May 2002, doi: 10.1049/ir:20020302.