

The Tribune **Version 1.0**

ALL AROUND THE WORLD

Low cost and defect free graphene

Graphene is one of the most promising new materials. However, researchers across the globe are still looking for a way to produce defect-free graphene at low costs. Chemists have now succeeded in producing defect-free graphene directly from graphite for the first time. They recently published their findings in the journal *Nature Communications*.

Lowering the cost and environmental footprint of white LEDs

Replacing traditional light bulbs with light-emitting diodes (LEDs) could take a significant bite out of global energy consumption. But making white LEDs isn't completely benign or budget friendly. To help reduce the environmental footprint and cost of these lights, researchers have developed the first white LED with a hybrid, metal-organic framework material. Their report appears in the journal *ACS Nano*.

New step towards clean energy production from enzymes

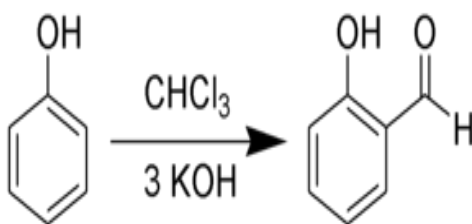
Oxygen inhibits hydrogenases, a group of enzymes that are able to produce and split hydrogen. This degradation is fatal for possible biotechnological applications of these enzymes for the production of clean energy. An international team lead by researchers from UCL (UK) and CNRS (France), including an Ikerbasque Research Fellow from CIC nanoGUNE, have combined theory and experiment to characterize each chemical reaction step that results in the reduction of oxygen by the enzyme. These results have been published in the journal *Nature Chemistry*.

LEARNING ZONE

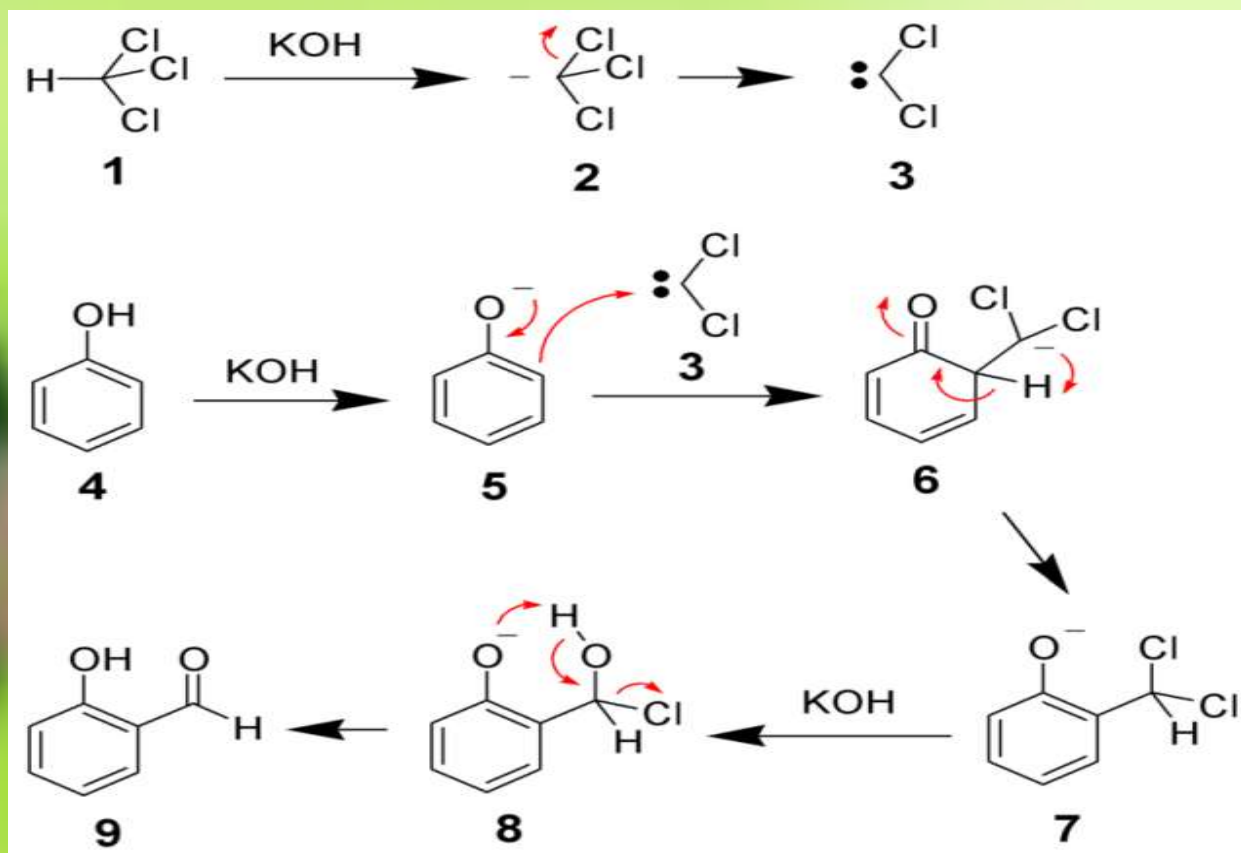
REACTION YOU MUST KNOW

RIEMER -TIEMANN REACTION

The **Reimer–Tiemann reaction** is a chemical reaction used for the ortho-formylation of phenols with the simplest example being the conversion of phenol to salicylaldehyde. The reaction was discovered by Karl Reimer and Ferdinand Tiemann.



MECHANISM:



INFORMATION ZONE

INDIAN OIL CORPORATION LIMITED (IOCL)

Indian Oil Corporation (Indian Oil) is India's Largest Commercial Enterprise, with a net profit of 103.99 billion (US\$1.5 billion) for the financial year 2015-16.

Standing true to its corporate vision of being 'The Energy of India', Indian Oil has been successfully meeting the energy demands of India for more than five decades. Being India's flagship national oil company, Indian Oil with a work-force of 33,000 efficient minds is living their vision of becoming 'a globally admired company'. It is the leading Indian Corporate in Fortune's prestigious 'Global 500' listing of world's largest corporates at 161st position for the year 2016.

Indian Oil Recruitment for the Graduate Engineers with [Gate](#) Score:

Indian Oil is looking for energetic and dedicated Graduate Engineers for the recruitment as Officers/ Graduate Apprentice Engineers (GAEs) in the following engineering disciplines:

- Civil Engineering (excluding Construction/ Environmental/ Transportation Engineering)
- Chemical Engineering (including Petrochemicals Engineering)
- Computer Science & Information Technology (excluding information & communications Technology)
- Electrical Engineering (including Electrical & Electronics engineering but excluding Electrical & Communication/ Telecommunication engineering)
- Instrumentation Engineering (Including Electronics & Instrumentation engineering but excluding Electronics & Communication engineering/Telecommunication engineering)
- Mechanical Engineering (excluding Production/ Manufacturing/ Industrial Engineering)
- Metallurgical Engineering

Educational Qualification:

- Candidates must have awarded bachelor's degree in engineering/ technology in the above mentioned disciplines (full time regular courses only) from recognized Indian Universities / Institutes.
- Candidates, belonging to General and OBC (non- creamy layer) categories, should have secured minimum 65% marks. It is relaxed to 'pass' for Scheduled Caste (SC)/ Scheduled Tribe (ST) /People With Disability (PWD) candidates.
- The candidates pursuing their graduation (BE/B.Tech) in combined disciplines like Mechatronics etc. will not be eligible for this post.

FUN ZONE

CHEMISTRY WORDSEARCH

N S C L I P C T A N M N H N B I N I N O
C A E R L O D I A O Y S L R O O E T D O
N I P N Y I E O N E T O P M N X A O O N
O O M O C S N H P Y I L U M D O R D M N
X T P R E I T A Y E R U E C I C A C E S
H R U A E B N A X M E T A L R O P P O E
E E M P S H O O L E A I S R R V E C C A
N E O E U U T I I L L O D I C A T E L B
A P L H O H T O L T O N E L M L P T U T
Y D L P E R I O D I C T A B L E C M E E
L A T R N O I N A N N A R E L N H A S N
M E M T E D P I L G E G E O P T O C C N
C I N C G R T T L P O I P R P I R O H T
C H O M O G E N E O U S O O U E E L I M
L A I D R E C A T I O N L I I T I L M S
N I U A E S N H C N T Y P G T N X O E I
H C C A T A L Y S T M H A A L O T I U T
T D A D E B T S U E A E N N I A L D M L
C E A L H L L I R S S N N R T E E H Y N
M A N A N S L L E D E M T O T L C R M L

ACID
ATOM
BOND
CHEMISTRY
CRYSTAL
HETEROGENEOUS
MELTING POINT
MIXTURE
PHASE
REACTANT

ALLOTROPE
BASE
CATALYST
COLLOID
ENDOTHERMIC
HOMOGENEOUS
METAL
NONMETAL
POLYMER
REACTION

ANION
BOILING POINT
CATION
COVALENT
EXOTHERMIC
IONIC
METALLOID
PERIODIC TABLE
PRODUCT
SOLUTION

NOTE: Words can be from upward to downward(vice-versa), left to right(vice-versa) and diagonally.

EXPLORE ZONE

COMPUTATIONAL CHEMISTRY

Computational chemistry is a branch of chemistry that uses computer simulation to assist in solving chemical problems. It uses methods of theoretical chemistry, incorporated into efficient computer programs, to calculate the structures and properties of molecules and solids. It is necessary because, apart from relatively recent results concerning the hydrogen molecular ion (dihydrogen cation, see references therein for more details), the quantum many-body problem cannot be solved analytically, much less in closed form. While computational results normally complement the information obtained by chemical experiments, it can in some cases predict hitherto unobserved chemical phenomena. It is widely used in the design of new drugs and materials.

Examples of such properties are structure (i.e., the expected positions of the constituent atoms), absolute and relative (interaction) energies, electronic charge density distributions, dipoles and higher multipole moments, vibrational frequencies, reactivity, or other spectroscopic quantities, and cross sections for collision with other particles.

The term *theoretical chemistry* may be defined as a mathematical description of chemistry, whereas *computational chemistry* is usually used when a mathematical method is sufficiently well developed that it can be automated for implementation on a computer. In theoretical chemistry, chemists, physicists, and mathematicians develop algorithms and computer programs to predict atomic and molecular properties and reaction paths for chemical reactions. Computational chemists, in contrast, may simply apply existing computer programs and methodologies to specific chemical questions.

Computational chemistry has two different aspects:

- Computational studies, used to find a starting point for a laboratory synthesis, or to assist in understanding experimental data, such as the position and source of spectroscopic peaks.
- Computational studies, used to predict the possibility of so far entirely unknown molecules or to explore reaction mechanisms not readily studied via experiments.

Thus, computational chemistry can assist the experimental chemist or it can challenge the experimental chemist to find entirely new chemical objects.

LET'S TALK CHEMISTRY

Why does hair turn grey?

Having grey hair is part of growing old. Even in your own family you are likely to have uncles and aunts who have grey or white hair. The changing of hair colour is just another example of chemistry at work in your own body.

Some hair-raising facts

There are over 100,000 strands of hair on your head. Sounds like a lot doesn't it? Before you begin to count them, you may be surprised to know that hair has the highest rate of cell division in your body and is the fastest growing tissue after bone marrow. This is why you will find your hair growing about 1cm every month.

You may not realise it, but hair is strong. One strand of hair can actually support 100 grams of weight, that's almost the weight of a cell phone.

So why does our hair turn grey?

Let's take a closer look at hair. Our hair is surrounded by a tissue under the skin called a follicle. Each follicle contains certain pigment cells. Pigment is another word for colour. These pigment cells constantly produce a chemical called melanin. This chemical is responsible for the colour of our hair whether it is black, blonde, red, or brown.

The Gene Connection

Now that we know what gives colour to hair; its time to understand what role family genes play in greying them? The content of melanin in each hair determines a dark or light colour of the hair.

Is there a particular time when you start to get grey hair? Yes, people can go grey at any age, some people may go grey in their thirties or forties or maybe even later and on the other hand some people may see their first grey hair when they are in high school. Yes, have a look. You might find that a friend of yours may have a grey hair or two. It all depends on your genes. So, if it's in your family to go grey early, then there's no avoiding it.

The fall of the follicle

As we grow older, the pigment cells found in the follicle of our hair die, leading to a smaller amount of melanin being produced. This results in your hair becoming more transparent in colour; like grey, silver or white.

The other reasons for your hair to turn grey include the climate, pollutants, toxins and chemical exposure.

Q & A ZONE

We all have heard a lot about internships, but what is it like in reality? Is it easy to get one, or it is an uphill task? In order to know the answer of all these questions let us see what Mr. AJAY SHARMA (Final year CST student) thinks about it. He did his internship in Growel India Ltd. and shared with us some of his internship experiences during a small talk session with us.

ThC: Why is Internship necessary? What do we learn during internship?

Ajay : Internship is not necessary. As it is a part of our Btech program, so we have to go for it. But we all here to become a good engineer studies all theory, lab. Internship provide us a real life stage. It is a challenge to use what we learnt and solve real life problem. So, in answer to what we learn from internship, firstly we self evaluate ourself where we stand from an engineer point of view, Secondly, we learn how to deal with different type of people, what is the practical following etc.

ThC: How did you approach the company for internship? What were the research you did about the company before going for internship?

Ajay: I search a lot in google, applied to several adds on internship site like internshala, sent emails to professor of my interest. As particular I dig that company should be of my field, should have good image and should provide all help (accommodation if possible) etc.

ThC: What are the skills company look for in the candidate for internship?

Ajay: Skills basically depends on each company, but some everyone must require, like good communication skills, you should be able to

push yourself under worst conditions, punctuality, your sincerity towards your goal, how you deal with people and ofcourse you should have good computer skills too.

ThC: Do our institute help us in getting internship?

Ajay: Truly speaking not much help has been provided. Companies don't reply to our training department head . Not even a single one from any branch got internship with the help of institute. We applied ourself, make our own arrangement, contacts.

ThC: What kind of work you were enrolled in there ? Was it the same as you expected? How it helped you in learning?

Ajay: I did my training at 'Growel India Ltd.'. A big company have seven different plant. I worked in lubricant department. My goal was to learn how to produce lubricant in bulk scale, how to modify their properties. I learnt not so much of chemistry but I learnt how to work in a real life problem. The environment was very good, it wasn't exactly the same as I expected, but I was ready to learn and wanted to be a part of good company.

ThC:Any good/bad experience during your internship you want to share?

Ajay: Everything was good, quite satisfactory. People there were very helpful. My mentor had 28 year experience and he worked at my best. I have done the amount of work (in 1 month) which normal people do in 6 months training.

ThC: Any suggestion for juniors!!

Ajay: Please be active in applying process. Do not depend on institute, make a good resume. Try to learn as much as you can, not just the work but the dealing with people is main goal.