

## Twitter Thread by NotTheMacAnon



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### **2020 marks the start of the quantum dot revolution.**

Completely ignoring the fact that "photocatalytic generation of reactive oxygen species (ROS) from quantum dots (QDs) has been widely reported."

Results: It was found that whereas singlet oxygen ( $^1O_2$ ) was not produced by photoexcited QDs, superoxide anion ( $O_2^-$ ) and hydroxyl radicals (OH) were generated by QDs, especially in the presence of a physiological concentration of electron donating agent including NADH.

Using cell metabolic activity assays and various probes of ROS generation, the formation of ROS in cellular environments was demonstrated.

Conclusion: Illumination of QD-treated cells and bacteria with light did affect viability. The above results, together with those of assays in the presence of various scavengers of specific ROS, indicate that the formation of ROS by QDs mainly proceeded via electron transfer.

Some electrons are directly transferred to  $O_2$  to generate reactive oxygen species (ROS) in the ETC.

... As signaling molecules, ROS play an important role in cell proliferation, hypoxia adaptation and cell fate determination, but excessive ROS can cause irreversible cell damage and even cell death.

Electron transfer is a process by which an electron moves from one atom or molecule to another. It is a key concept in redox chemistry – the chemistry of reactions where one reaction partner loses electrons (oxidation) while the other gains electrons (reduction).

Ferric means the iron atom has lost three electrons to form  $Fe^{+3}$ , and ferrous means the iron atom has lost two electrons to form  $Fe^{+2}$ . ... For example, ferric would be  $Fe(III)$  indicating  $Fe^{+3}$ , and ferrous would be  $Fe(II)$  indicating  $Fe^{+2}$ .

Iron(III) oxide-hydroxide or ferric oxyhydroxide is the chemical compound of iron, oxygen, and hydrogen with formula  $FeO$ . The compound is often encountered as one of its hydrates,  $FeO \cdot nH_2O$  [Rust].

Similar behavior is exhibited by some iron compounds, such as the ferrites and the mineral magnetite, a crystalline form of the mixed iron(II,III) oxide  $\text{Fe}_3\text{O}_4$  (although the atomic-scale mechanism, ferrimagnetism, is somewhat different).

<https://t.co/TPBtYuGPVR>

# ISOLATION OF CRYSTALLINE TOBACCO MOSAIC VIRUS PROTEIN FROM TOMATO PLANTS\*

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The isolation of a crystalline protein possessing the properties of tobacco mosaic virus has been described (1, 2). This crystalline protein was obtained from the globulin fraction of extracts of diseased Turkish tobacco plants, and was found to be over 100 times as active as the crude juice from the diseased plants used as starting material. The chemical composition, optical rotation, and infectivity of the crystalline protein remained unchanged after ten successive recrystallizations. These facts have suggested that the protein is essentially pure and is the agent responsible for the tobacco mosaic disease.

The tobacco mosaic disease, as is well known, occurs in plants belonging to many different genera of the solanaceous family. The disease was first described in tomato plants by Clinton (3), who showed that the infectious material obtained from tomato plants infected with tobacco mosaic virus produced the same symptom complex on healthy tobacco plants as that caused by infectious material from diseased tobacco plants. As the juice obtained from diseased tomato plants is highly infectious, such plants offered the possibility of providing a new source of material for the isolation of the tobacco mosaic virus protein. If the protein is the infectious agent, then it would necessarily be present in mosaic-diseased tomato plants. The isolation of a similar highly infectious, crystalline protein from diseased tomato plants would prove that this protein is associated with the tobacco mosaic disease in tomato plants and would provide additional evidence

\* A preliminary announcement of this work was published in *Science*, **83**, 85 (1936).

So basically superparamagnetic piezoelectric crystalline nanoparticles dressed up as viruses do indeed cause oxidative stress related diseases.

Activated by light?