



Reconstructing primordial [Ni]-hydrogenase

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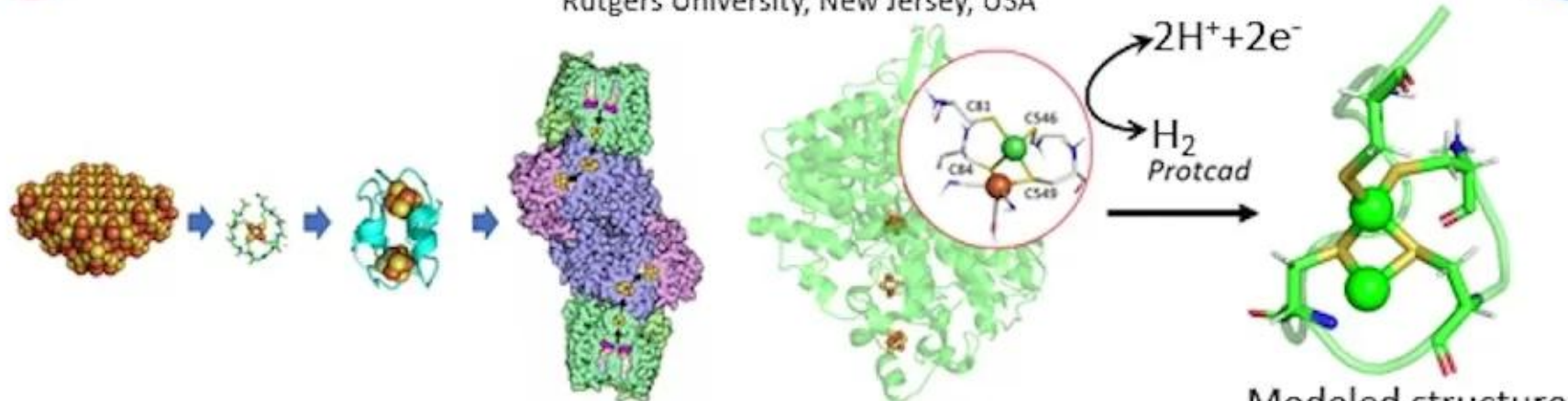


Fig. 1. Evolution of protein

pdb id: 5XLE

Modeled structure
(13 amino acids)

Fig. 2. Modeled enzyme (NB).

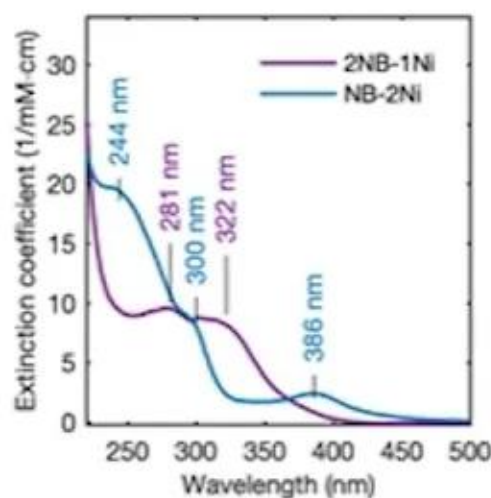


Fig. 3. UV-vis spectrum

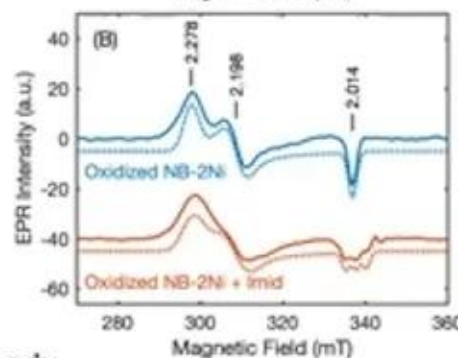
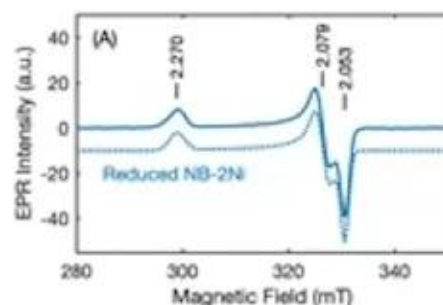


Fig. 4. EPR of reduced and oxidized NB.

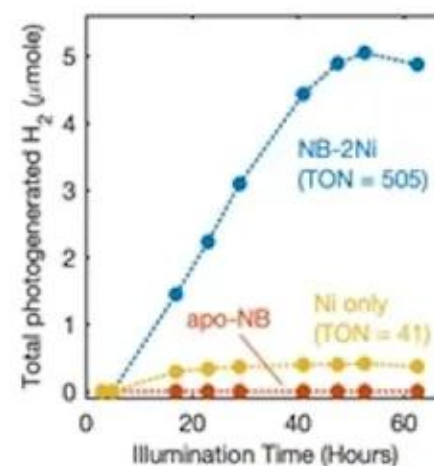


Fig. 5. Gas chromatograph showing H₂ production.



1
00:00:03,909 --> 00:00:02,070
thank you committee for the opportunity

2
00:00:05,190 --> 00:00:03,919
my name is rose i'm a secondary mpp

3
00:00:07,749 --> 00:00:05,200
fellow at parkinson university in new

4
00:00:10,629 --> 00:00:07,759
jersey usa so the main hypothesis of my

5
00:00:12,230 --> 00:00:10,639
project is a short 8 to 15 amino acid

6
00:00:14,070 --> 00:00:12,240
long peptide because the spontaneously

7
00:00:15,669 --> 00:00:14,080
formed on early earth

8
00:00:18,390 --> 00:00:15,679
that could have used the minerals in its

9
00:00:19,590 --> 00:00:18,400
surrounding to form a a short

10
00:00:22,870 --> 00:00:19,600
electron transferring or catalytic

11
00:00:24,550 --> 00:00:22,880
protein as shown in um figure one a

12
00:00:26,070 --> 00:00:24,560
great example of a catalytic protein

13
00:00:27,670 --> 00:00:26,080

includes hydrothen that's shown in

14

00:00:29,269 --> 00:00:27,680

figure two so what we wanted to do was

15

00:00:32,389 --> 00:00:29,279

really mimic the active site shown in

16

00:00:34,709 --> 00:00:32,399

the red circle and model a short peptide

17

00:00:37,190 --> 00:00:34,719

that could coordinate these metals and

18

00:00:39,510 --> 00:00:37,200

function as an s hydroxides right

19

00:00:40,389 --> 00:00:39,520

so uh and then what we're trying to do

20

00:00:42,069 --> 00:00:40,399

right now is the structural

21

00:00:44,229 --> 00:00:42,079

characterization uh figure three is

22

00:00:45,750 --> 00:00:44,239

showing if it is showing distinct two

23

00:00:48,069 --> 00:00:45,760

distinct species

24

00:00:50,549 --> 00:00:48,079

figure four epr of both reduce and

25

00:00:53,430 --> 00:00:50,559

oxidize form of our enzyme and figure

26

00:00:55,270 --> 00:00:53,440

five is a gas chromatography which shows

27

00:00:56,389 --> 00:00:55,280

the hydrogen production as compared to

28

00:00:57,750 --> 00:00:56,399

the control

29

00:01:00,150 --> 00:00:57,760

with that thank you and please don't