

2020 .63 .6 41 4 // . /10.100 / 11426-01 - 21-0

1, 1, 1, 2\* &

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1, 201, 2020, 30, 2020

5.

1 4 . , ( 30 %

\* ( . . . ) ,

( +)

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2 .

( ( 3)262, %), ( 24 62442),
( 3 2, %), ( 66,
%), N,N( 3 , .5%)

/ (20 % ) .

10 2 0.1 ( 3)2. -

(240 ), (42 ), (15 ) 20 <sub>2</sub> /

. , - /

0° 12 . -

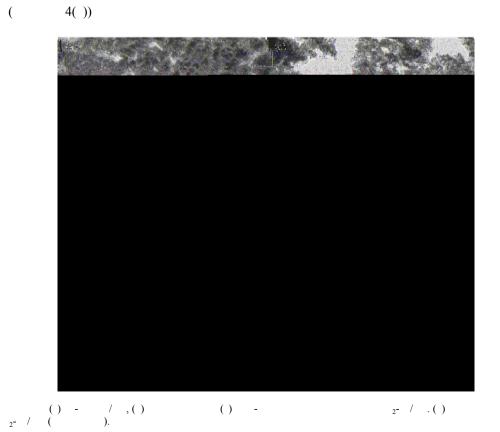
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( 1( )). , - / ( 1( , )). , - /

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iR ( 5( )).
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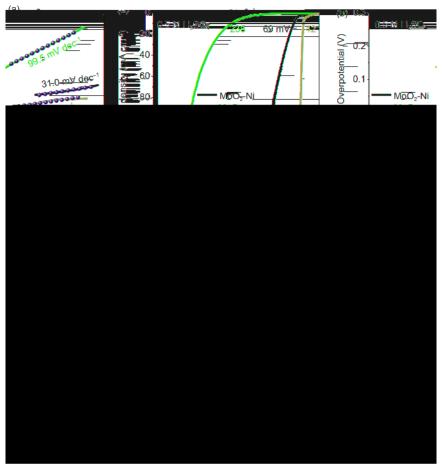
(25 1 ). **2**( )). 500 , ( 2( )). -0.34 500 , 0.20 (011)2( )) 3 ,3 . 1()) (111)-106) 0 12), ( 3). 2 23.2 1). 4( )). <sub>2</sub>- / ( 5( )). 1( ) ( )). (2 4.0 ), (2 4. 150 50 <sup>1</sup> 35,36. (2 6.0 ), 3 ,40 . 41 .

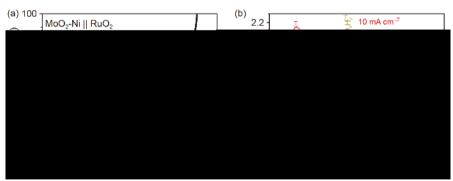


24 .

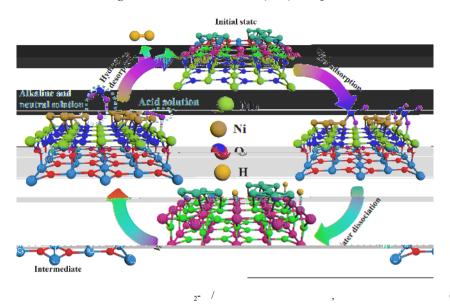
3(), 3

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336
                                                         46 mV
              MoO₂-Ni
                                        MoO<sub>2</sub> Ni 3
                                                       MoO<sub>2</sub>-Ni
             MoO<sub>2</sub>
                                                                                       56.9 mV.dec
                                                                      0.0
                                 -0.5 -0.4 -0.3 -0.2 -0.1 0.0
                                                                                      0.6
                                                                           0.0
                                                                                            0.9
                                                                                                   \log |j| (mA cm ^2)
                                                           E(V)(vs. RHE)
                                                                                    (e)
   2/ , / 20 % / 1.0
                                                                                                         (C)
                                                       ,()
                                     .()
                                                               (31.0
       ( )
                                                               / (30.1
               25 .
                                                                1.0
                                                                               (35
1,51,52.
                                                                                                      (332
                     4( ),
                                                                 5.3
                                                                (10 .
                                                                                             (150.6
                                          1.0
                            1.4
                                                                                                    5( ),
100
                          3).
                                                                                                    4.1%.
                          1.0
                                          0.5
                                                                                25.2%
                                                                                           25.1\%
0.42
         1.50
                                                  25.
                                                                                                   12)
                                                                         ,
13).
20
               0.5
10
                                                                                                                      6( )).
                                      (23
        5( ),
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, (3), 1).



, 0.5 <sub>2 4</sub> 1.0 , , 2<sup>-</sup>
36

2·

(21 65005), (201 2 40 201 2 1220), - ( - 1 015 201 004).

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