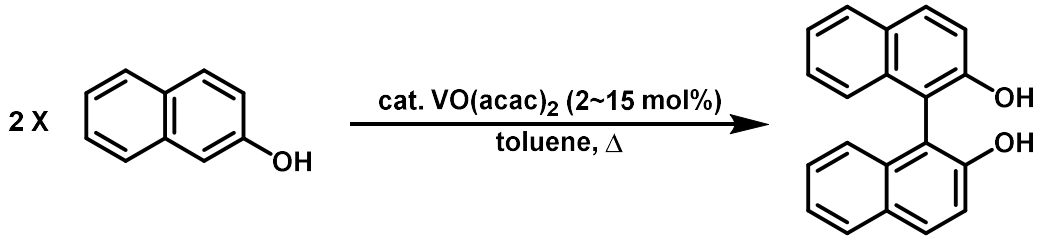
有機化学実験

3-A Oxidative Coupling

Oxidative Coupling of 2-naphthol



Regents

2-Naphthol (mw = 144.17) (3.0 g, 20.8 mmol)
$VO(acac)_2$ (mw = 265.16) (100~800 mg, 0.4~3.0 mmol)
Toluene (10 mL)

Preparations

1. In 25mL egg-plant flask, 2-Naphtol and $VO(acac)_2$ were suspended in 10 mL of toluene at room temperature .

2. The reaction mixture was hearted at over 70 ℃ on an oil bath. At that temperature, resulting dark red solution was swirled over 60 min.

3. After swirled over 60 min, the resulting dark green suspension was allowed to cool to room temperature.

4. Resulting reside was collected by filtration and washed with $MeOH/H_2O$ (7/3) mixture (10 mL x 3).
The reside was dried for over night.

5. The reside was dissolved into MeOH with heating on a steam bath. After almost solved the reside, activated charcoal was added to the solution. Then, the mixture was heated on a steam bath for 5 to 10 min and filtrated. The filtrate was allowed to cool t o room temperature.

形式酸化数

○ 酸化／還元反応と酸化数

酸化数：原子の酸化状態を表す指標。反応の前後における酸化数を比較すれば、その反応でその原子が、酸化されたか、還元されたかが理解できる。

酸化数の求め方：

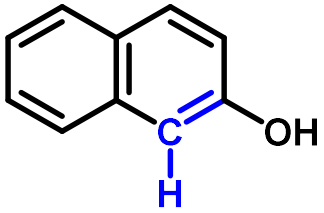
1. 単体の元素の酸化数は0
2. 化合物（イオン）中の酸素(O)の酸化数は−2

（過酸化水素HOOHの酸素は−1 ）

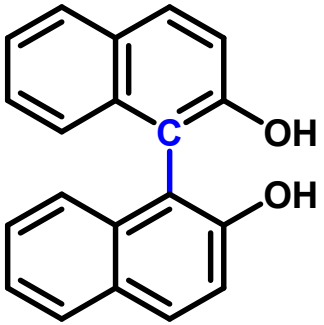
3. 化合物（イオン）中の水素(H)の酸化数は＋1

（ヒドリド：H^-と考えられるものは−1）

4. 化合物（イオン）中のハロゲンの酸化数は−1
5. 化合物（イオン）中のアルカリ金属の酸化数は＋1
6. 化合物（イオン）中のアルカリ金属土類の酸化数は＋2
7. 化合物中の全ての原子の酸化数の総和は0
8. n価のイオン中の全ての原子の酸化数の総和はn



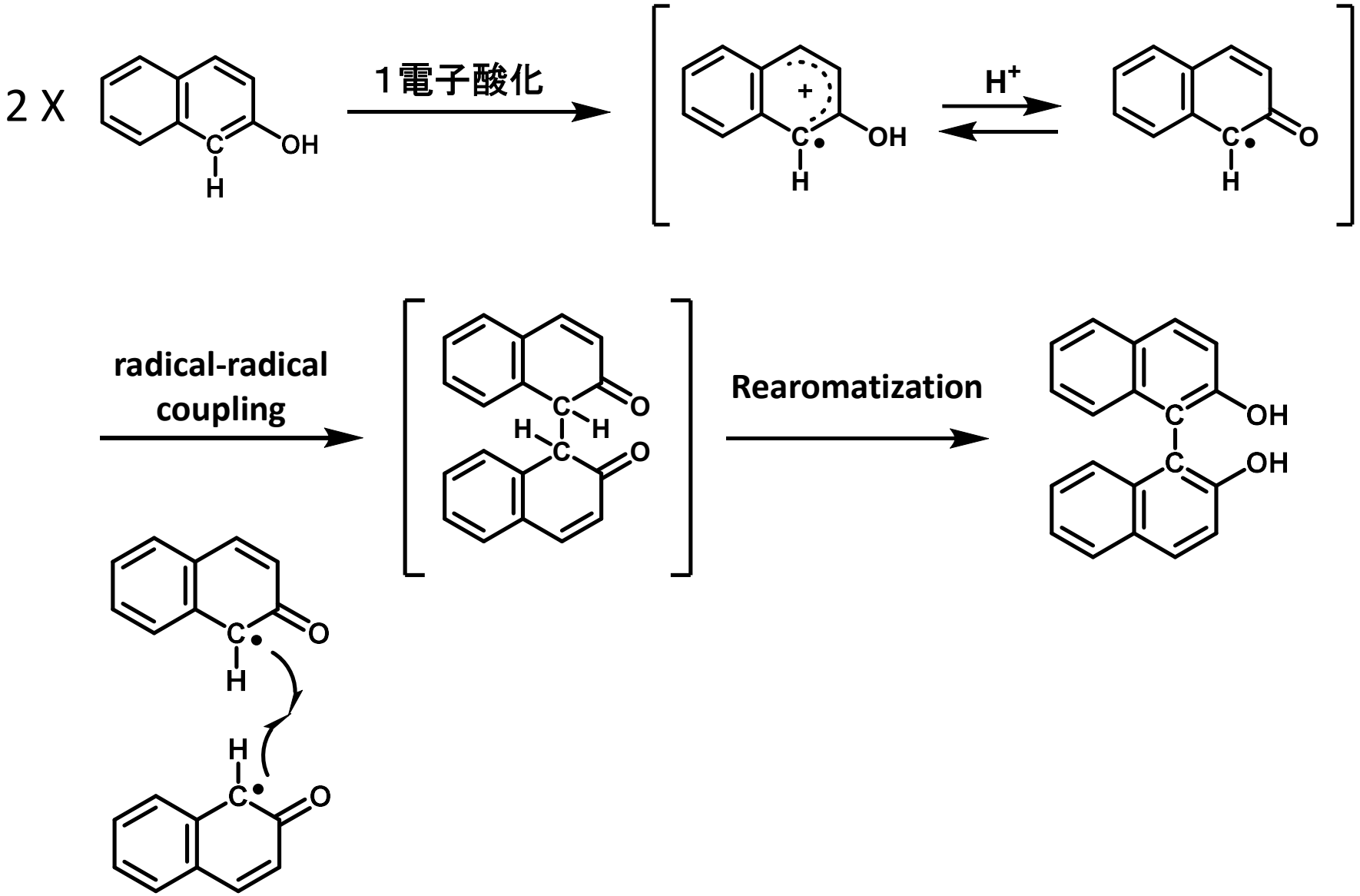
炭素原子：−1
水素原子：＋1



炭素原子：0

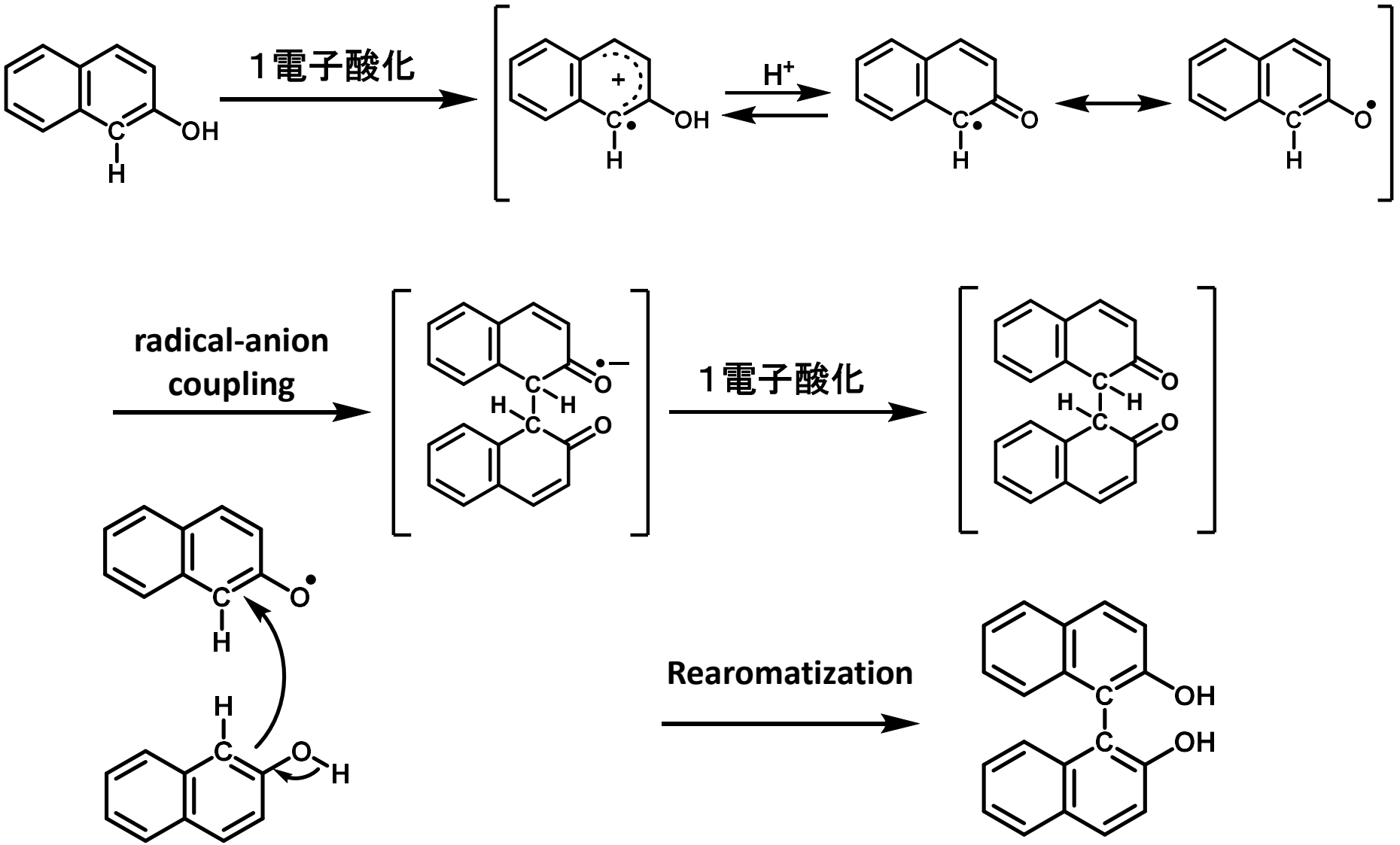
Typical Mechanism of Oxidative Coupling of 2-naphthol

- Radical-radical coupling



Typical Mechanism of Oxidative Coupling of 2-naphthol

- Radical-anion coupling



Typical Mechanism of Oxidative Coupling of 2-naphthol

- VO catalyzed oxidative coupling