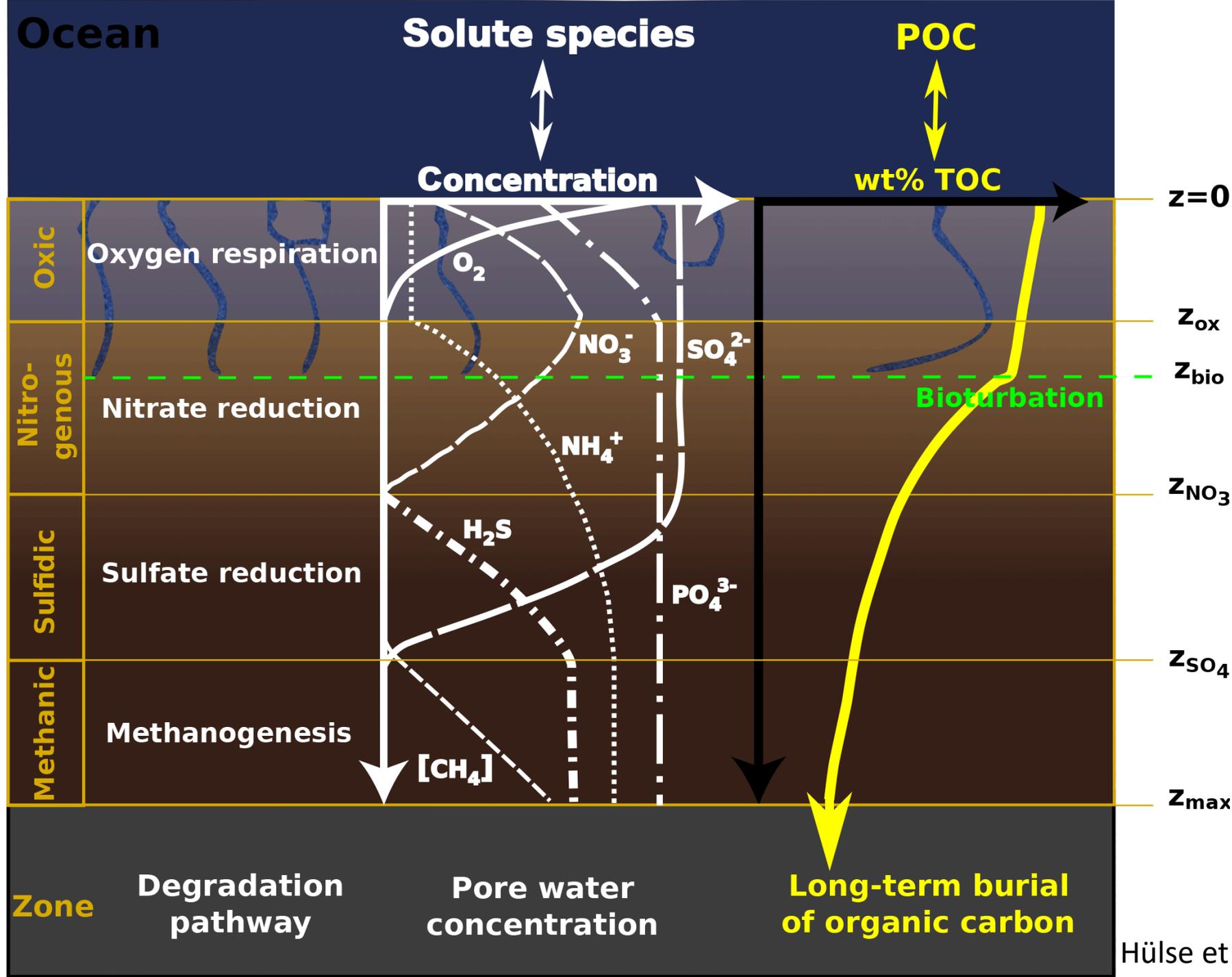


Diagênese da matéria orgânica

GSA0252-Sedimentologia

Diagênese

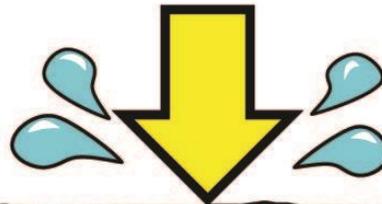


Carbonização (carvonização/coalification)



Peat

Burial pressure, heat, and time



Lignite



Sub-bituminous



Bituminous



Anthracite



Linhito



Carvão betuminoso



Antracito



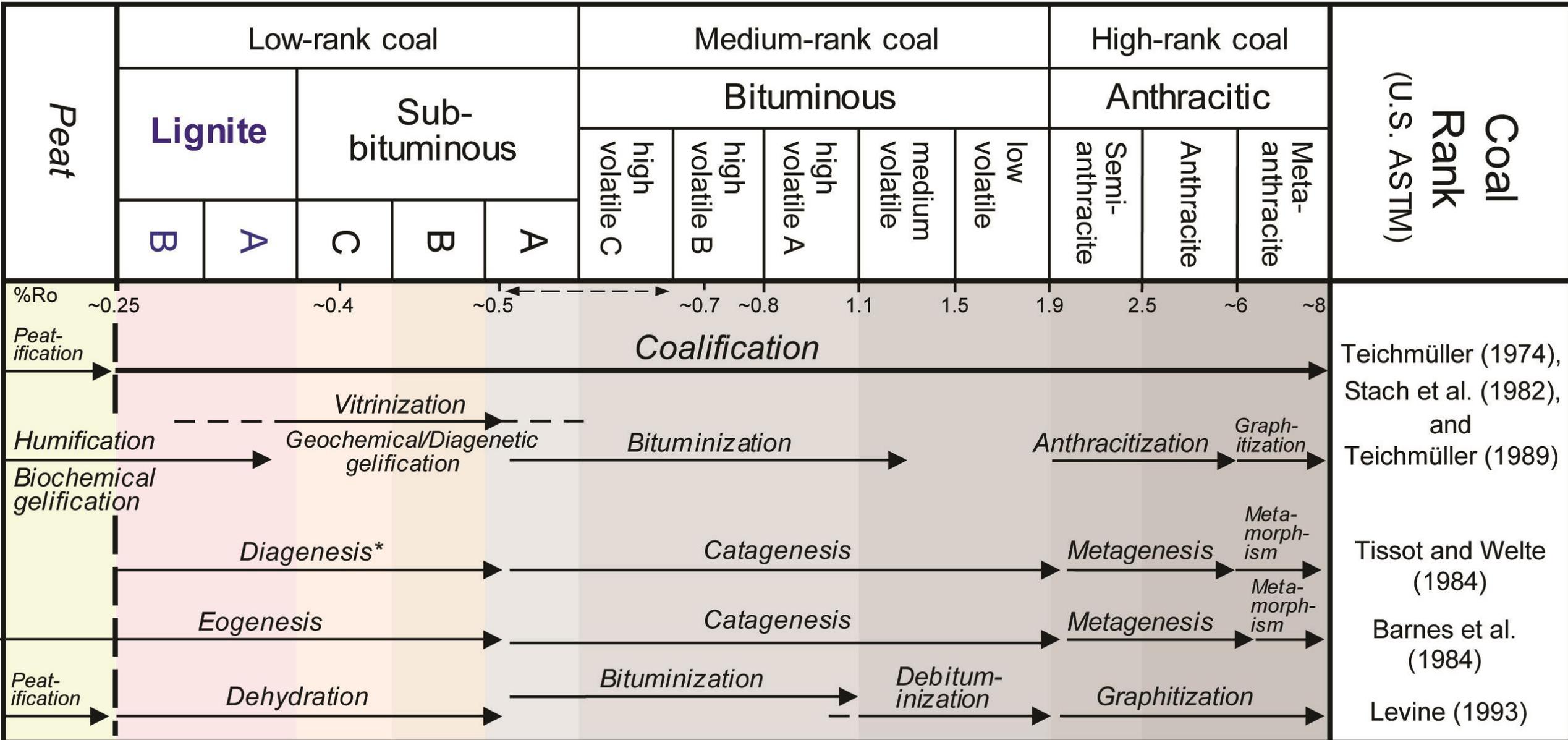
Tipo

Coal type	Lithotype	Appearance
Humic (banded)	Vitrain	Bright, black, shiny and brittle bands, usually with cracks or fissures. Tends to break into small cubes.
	Clarain	Semi-bright (between vitrain and clarain), black, and finely interlayered bands (mm-scale) of vitrain, durain, and sometimes fusain.
	Durain	Dull, black to gray-black bands which have rough surface. Bands have less cracks (fissures) than vitrain. Tends to break into lumps.
	Fusain	Black to gray bands with silky lustre (shine). Sometimes fibrous. Soft and friable, sometimes like charcoal.
Sapropelic (non-banded)	Cannel	Black to dark gray, non-banded coal with dull to greasy lustre (shine). Often breaks with conchoidal (glass-like) fracture.
	Boghead	Similar to cannel but brownish color.

Rank

Peat	Low-rank coal			Medium-rank coal					High-rank coal			Method for determining rank (dmmf) (U.S. ASTM)				
	Lignite		Sub-bituminous		Bituminous					Anthracitic						
	B	A	C	B	A	high volatile C	high volatile B	high volatile A	medium volatile	low volatile	Semi-anthracite		Anthracite	Meta-anthracite		
	5,000	6,300	8,300	9,500	10,500	11,500	13,000	14,000	<i>Less distinct for changing rank</i>						Calorific value (Btu/lb.)	
			<i>Less distinct for changing rank</i>							31	22	14	8	2	~0	Volatile matter (%)
			<i>Less distinct for changing rank</i>							69	78	86	92	98	~100	Fixed Carbon (%)

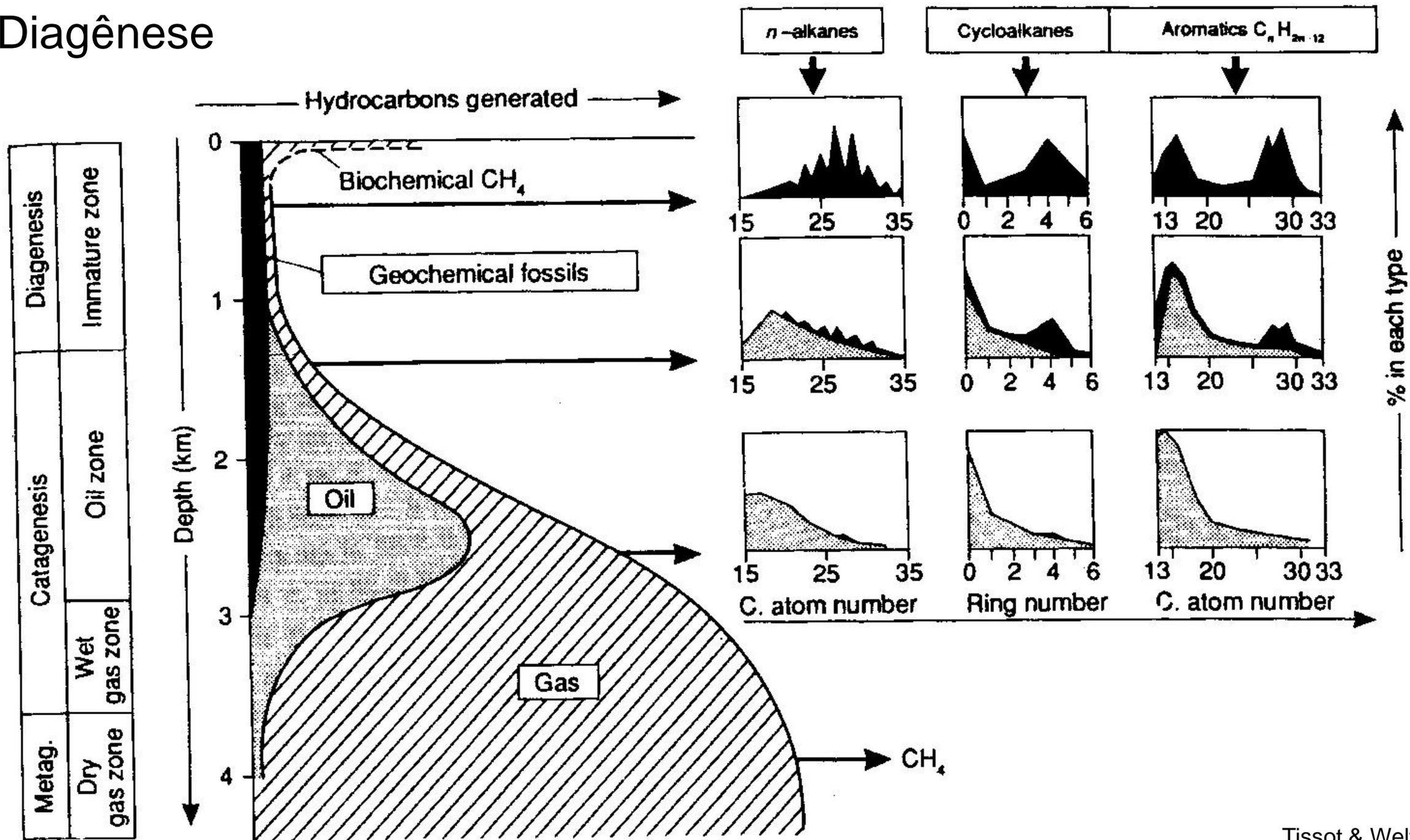
Processos diagenéticos vs Rank



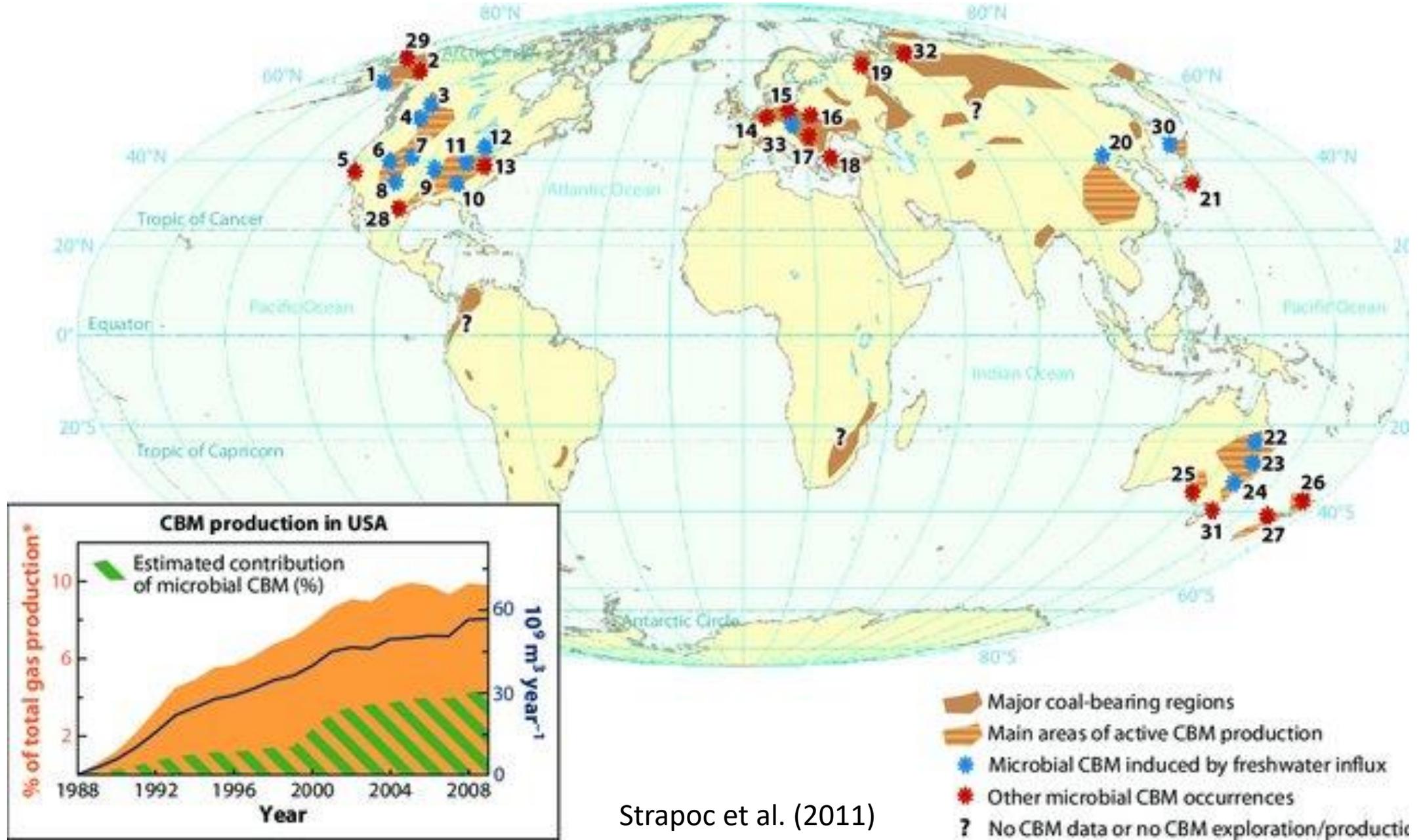
<https://www.uky.edu/KGS/coal/index.php>

<https://energy.usgs.gov/PhotoAtlas/default.aspx?aid=14>

Diagênese



Coalbed methane (CBM)

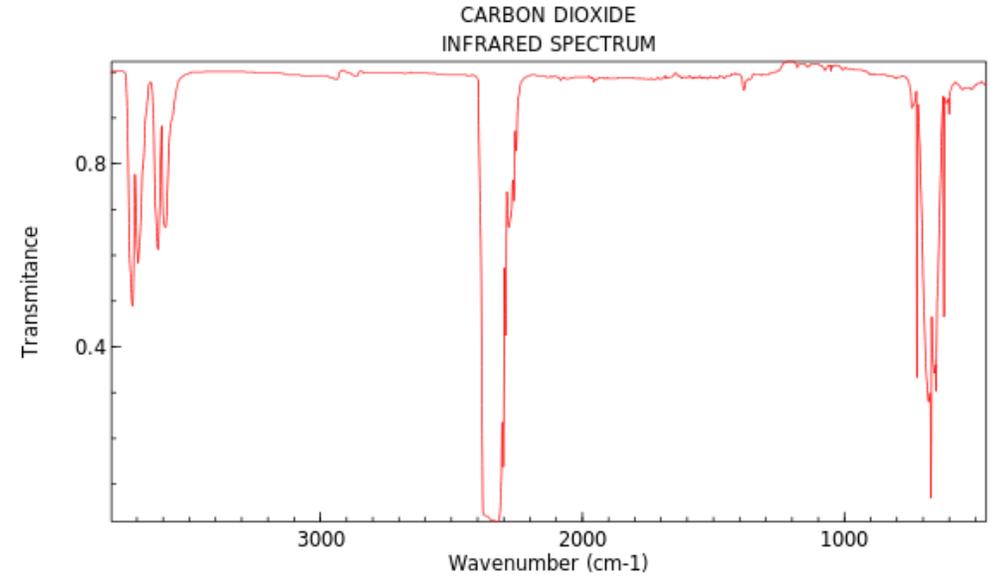
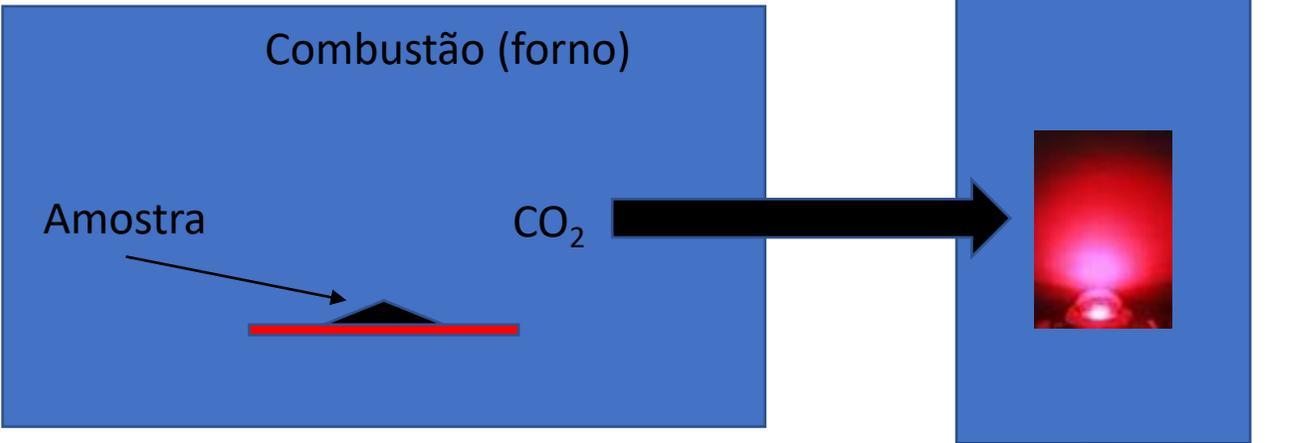


Strapoc et al. (2011)

Como caracterizar rochas pelíticas?

- Presença ou ausência de fissilidade
- Teor de carbono orgânico (COT)
- Tipo de querogênio (Pirólise rock-eval e petrografia orgânica)
- Maturidade térmica (Ro)
- Composição química (FRX e ICP)
- Composição mineralógica (DRX e MEV)
- Porosidade (Adsorção de N₂)

COT (Carbono orgânico total) e CIT (carbono inorgânico total)



NIST Chemistry WebBook (<https://webbook.nist.gov/chemistry>)

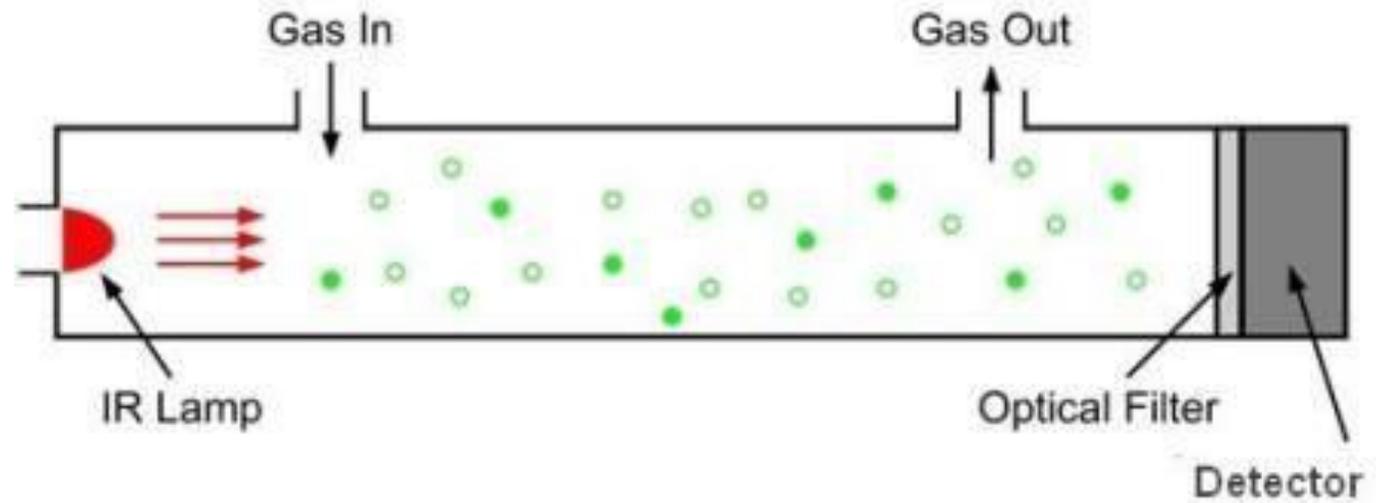
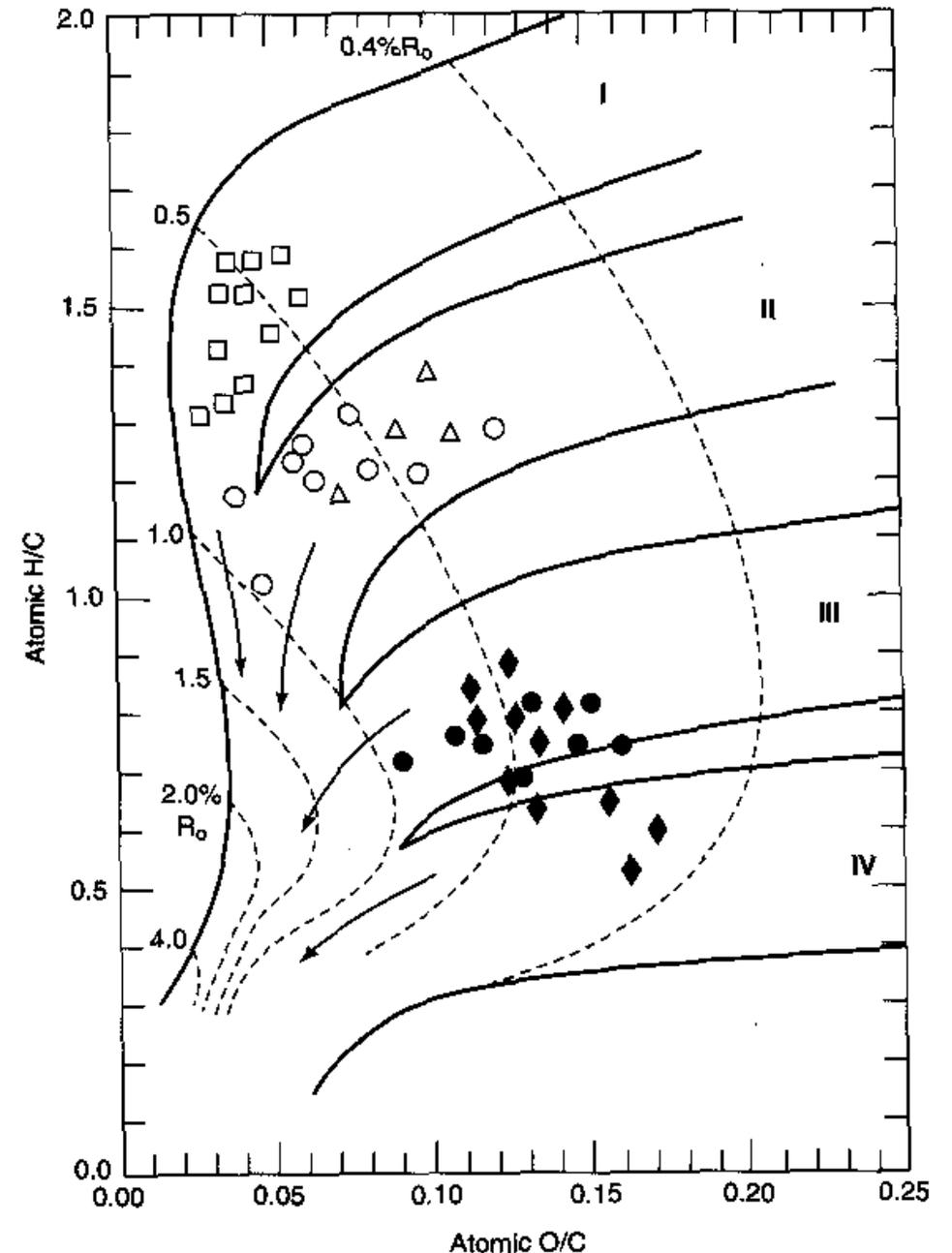
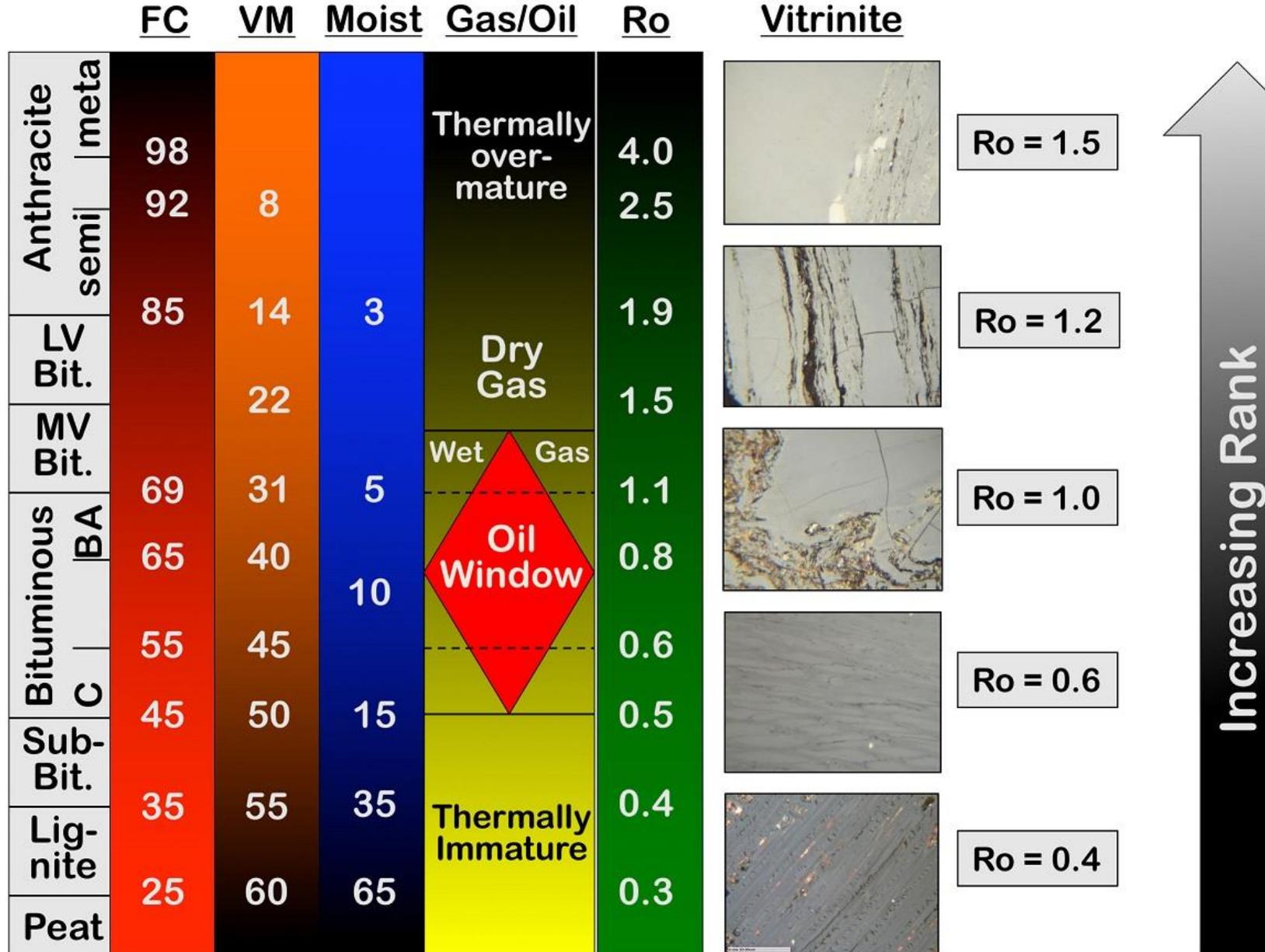


Diagrama de Van Krevelen

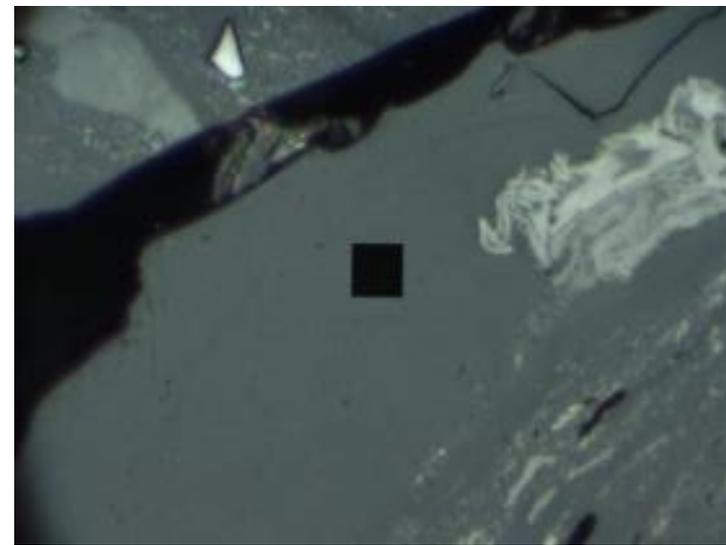
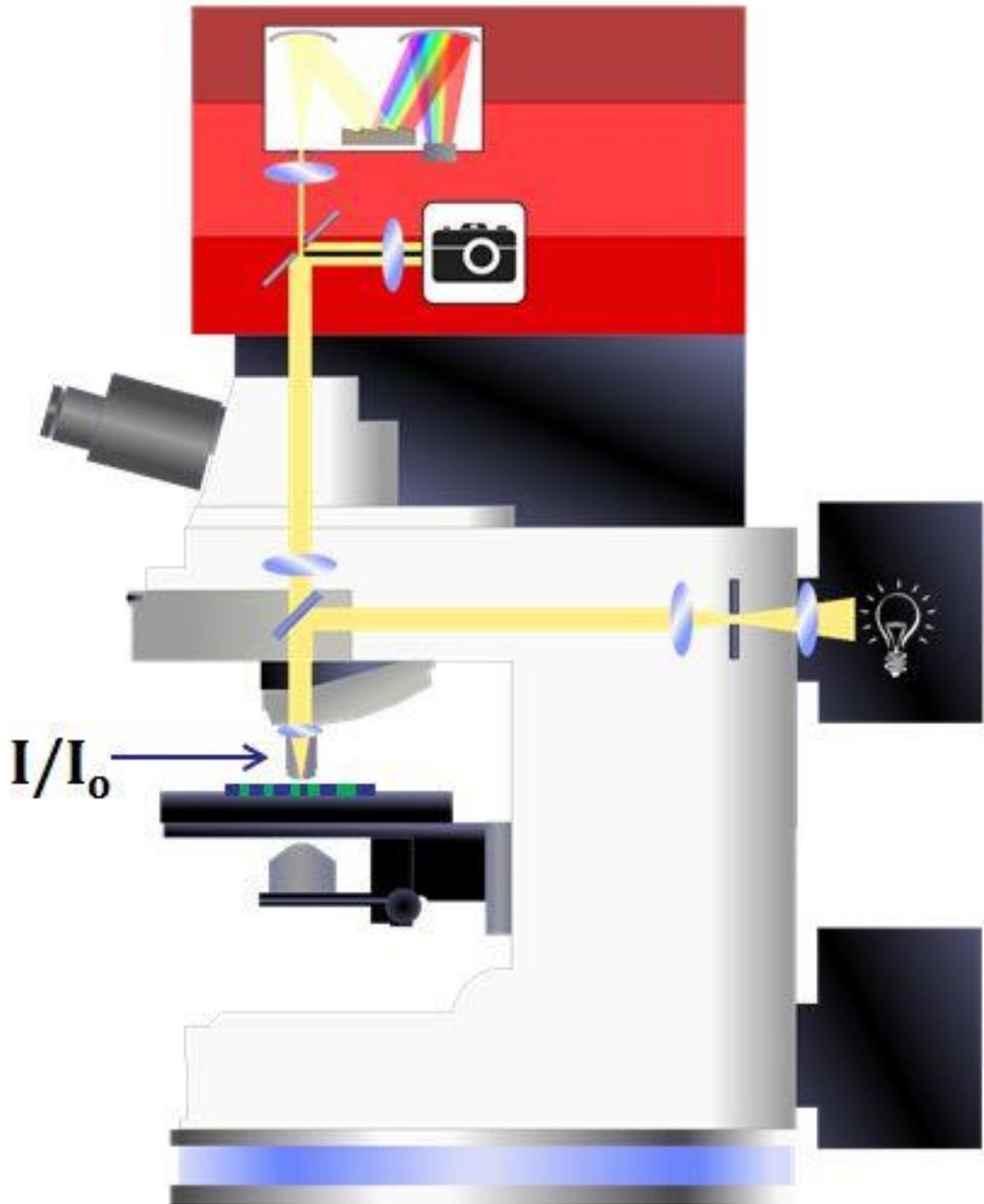
Querogênio	H/C	O/C	Origem
Tipo I	1,5 a 1,8	<0,1	Lacustre
Tipo II	1,0 a 1,3	<0,15	Marinha
Tipo III	<1,0	0,2 a 0,3	Plantas terrestres
Tipo IV	<0,5		I,II ou III oxidada



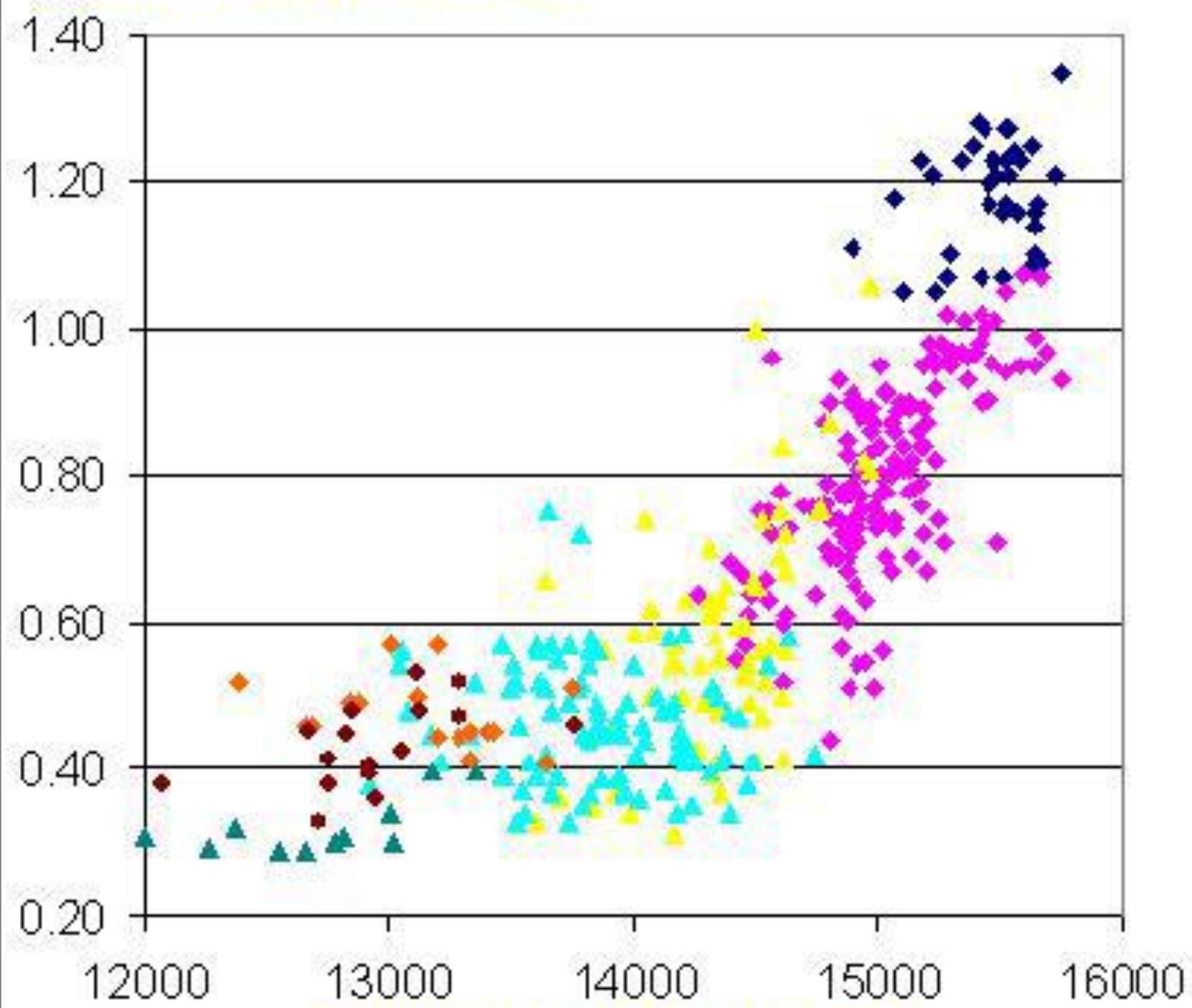
Reflectância de vitrinita



FC = Carbono fixado
 VM = Matéria volátil
 Moist = Umidade
 Ro = reflectância de vitrinita



Random Vitrinite Reflectance



Relationship between Calorific Value, Vitrinite Reflectance, & ASTM Rank Categories

- ◆ mvb
- ◆ hvAb
- ▲ hvBb
- ▲ hvCb
- ◆ subA
- ◆ subB
- ▲ subC

Calorific Value BTU's/lb (daf)