

COAL GASIFICATION IN THE MELTED SLAG

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The study of kinetics of coal conversion process and its energy supply due to complete oxidation of its part has been carried out. The process does not require to use oxygen, steam and can utilize coal with high content of ash (up to 40%). The data obtained are sufficient for designing and constructing a pilot plant.

Background of new decision search for coal processing in Ukraine:

- Mining of fossil fuels in Ukraine provides the needs in: oil by 10 - 12%, natural gas by 20-25%, coal by 100%.

- Gas deficit in Ukraine is about 55 milliard m³. The lack of it is compensated by import.

- The explored reserves of coal in Ukraine exceed 50 milliard tons, its amount being sufficient for more than 400 years (~30% is salt coal which does not find its application in industry).

Ukrainian manufacture has to organize the coal processing into liquid and gaseous products decreasing natural gas and oil consumption !

Characteristic of technologies of coal conversion in syngas

Index	Method					
	Lurgi	Winkler	Koppers-Totzek	Texaco	Melted slag	
1. process type	steam-oxygen				water	
2. reactor type	stationary	fluidized bed	dust flow	coal-water suspension	coal-water suspension	
3. gas yield, m ³ per t. of coal	1350	1500	1900	-	1880	
4. consumption, kg/1000m ³ SG	steam	900	300	50	-	
	water	-	-	-	-	355
5. oxygen consumption, kg/1000m ³ SG	230	325	500-640	-	0,0	
6. degree of carbon conversion, %	90	85	89	90-95	99	
7. temperature in the reaction zone, °C	750-1100	820-1100	1300-1500	1100-1500	1500-1800	
8. pressure, MPa	2-3	0,10-0,14	1,5	2-3	3	
9. residence time, sec	≈5000	100-500	1	-	0,3-0,5	
10. reactor volume, m ³	157	550	28 (2 injectors)	-	40 three zones	
11. height of the melted layer, m	-	-	-	-	до 1	
12. calorific value of SG, MJ/m ³	10,6	9,2	10,6	10,2	11,7	
13. efficiency of gasification, %	75-85	65-85	69-75	74	90	
14. composition of SG %vol.:	CO	21	35	57,2	52,3	46,9
	CO ₂ + H ₂ S	28	22	10,8	12,7	0,1
	H ₂	41	41	30,7	33,2	50,2
	CH ₄	9	1	0,1	-	0,9
	N ₂	1	1	1,2	-	0,2